

FINAL SUBMITTAL

## VOLUME IV, APPENDIX I

# ENERGY ENGINEERING ANALYSIS PROGRAM STUDY FORT LEONARD WOOD, MISSOURI

Prepared for

KANSAS CITY DISTRICT  
CORPS OF ENGINEERS  
KANSAS CITY, MISSOURI

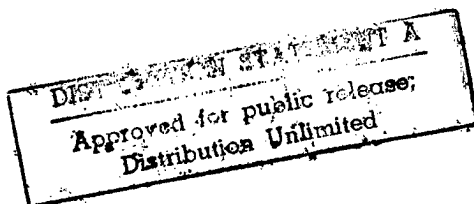
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### PREVIOUSLY SUBMITTED

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- F ENERGY CALCULATIONS

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- G COST ESTIMATES
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### Volume IV

- I COMPUTER SIMULATIONS

## LIST OF ABBREVIATIONS

AC	-	air conditioning
ACC	-	anticipated contract cost
ACCU	-	air cooled condensing unit
ACM	-	asbestos containing material
ACU(s)	-	auxiliary control unit(s)
AHU	-	air handling unit
AI	-	analog input
AO	-	analog output
ASCII	-	American Standard Code for Information Interchange
ASHRAE	-	American Society of Heating, Refrigeration, and Air conditioning Engineers
B/C	-	benefit-to-cost ratio
BCD	-	binary coded decimal
BLDG	-	building
BEACON	-	Building Energy Simulation Program
Btu	-	British thermal units
Btuh	-	British thermal units per hour
B/W	-	black and white
C	-	Celsius
CCC	-	central communications controller
ccf	-	one hundred (100) cubic feet
CCU	-	central control unit
cf	-	cubic foot, cubic feet

cfm	-	cubic feet per minute
CLM	-	command line mnemonic
CLMI	-	command line mnemonic interpreter
COE	-	Corps of Engineers
COS	-	central operator station
CPU	-	central processing unit
CRT	-	cathode ray tube
CU(s)	-	control unit(s)
CWE	-	current working estimate
d	-	day(s)
DCP	-	duty cycle program
DEH	-	Directorate of Engineering and Housing
DHW	-	direct memory access
DI	-	digital input
DO	-	digital output
DOD	-	Department of Defense
DPW	-	Department of Public Works
DTM	-	data transmission media
DX	-	direct expansion
E/C	-	energy-to-cost ratio
ECIP	-	Energy Conservation Investment Program
ECO	-	energy conservation opportunity
EEAP	-	energy engineering analysis program
eff	-	efficiency

elec.	-	electricity
EMC	-	EMC Engineers, Inc.
EMCS	-	energy monitoring and control system
EMI	-	electromagnetic interference
ESCO	-	energy service company
F	-	Fahrenheit
FO	-	fiber optic(s)
ft	-	foot, feet
ft <sup>2</sup>	-	square feet
FY	-	fiscal year
gal	-	gallon(s)
hp	-	horsepower
hr	-	hours(s)
H & V	-	heating and ventilating
HVAC	-	heating, ventilation, and air conditioning
in.	-	inch(es)
I/O	-	input/output
kBtu	-	one thousand British thermal units
kcf	-	one thousand cubic feet
klb	-	one thousand pounds
kva	-	kilovolt - ampere
kW	-	kilowatt, one thousand watts
kWh	-	kilowatt-hour, one thousand watt-hours
lb	-	pound(s)

LCCA	-	life cycle cost analysis
LED	-	light emitting diode
LPG	-	liquified petroleum gas
MAU	-	make-up air unit
MBtu	-	one million Btu
MCR	-	master control room
MHz	-	megahertz
Mh	-	man-hours(s)
mo	-	months(s)
MW	-	megawatt, one million watts
MWh	-	megawatt-hour, one million watt-hours
MZAHU	-	Multizone air handling unit
NA	-	Not active or Not applicable
NG	-	natural gas
NOAA	-	National Oceanic and Atmospheric Administration
no.	-	number
OA	-	outside air
O&M	-	operation and maintenance
PM	-	preventative maintenance
PROM	-	programmable read-only memory
psi(a)(g)	-	pounds per square inch (absolute) (gage)
RAM	-	random access memory
RCU(s)	-	remote control unit(s)
RTC	-	real-time clock

RTDOS/E	-	real-time disk operating system /executive
S&A	-	Supervision and Administration
scfm	-	sea-level cubic feet per minute
SES	-	shared energy savings
SIOH	-	supervision, inspection, and overhead
SIR	-	savings-to-investment ratio
SPW	-	single present worth
sq.ft.	-	square feet
st/sp	-	start/stop
stm	-	steam
SZAHU	-	single zone air handling unit
t	-	ton
temp	-	temperature
TRY	-	test reference year
UA	-	overall heat transfer coefficient (Btu/hr/ft <sup>2</sup> /°F)
UCU(s)	-	unitary control unit(s)
UH	-	unit heater
UPW	-	uniform present worth
VAV	-	variable air volume
wk	-	week(s)
yr	-	year(s)



APPENDIX I  
COMPUTER SIMULATIONS

## INTRODUCTION

Appendix I contains Computer Energy Simulation Data for fifteen representative buildings at Ft. Leonard Wood. Each representative building contains the following data:

- Energy Constant Calculation sheets
- Building Heating Load Calculation sheet
- Building Internal Load Calculation sheets  
(People, Lights, and Equipment)
- Computer Energy Simulations from BEACON and TRACE  
energy computer programs

Sample computer simulation sheets on the following pages show how building energy use is extracted from the output reports of BEACON and TRACE.

# SAMPLE BEACON COMPUTER SIMULATION

BEACON Energy Analysis By Energy Systems Engineers, Inc.

625.I

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	118.32	.00	3.32	8.23	1.24	22.94	12.6
FEB	93.14	.00	2.95	7.32	1.12	20.46	12.6
MAR	75.69	.07	3.26	8.08	1.24	22.60	20.5
APR	31.91	.78	3.14	7.77	1.20	21.77	23.5
MAY	4.71	1.85	3.32	8.23	1.24	22.94	26.4
JUN	.00	4.38	3.14	7.77	1.20	21.77	31.1
JUL	.00	6.22	3.26	8.08	1.24	22.60	33.0
AUG	.00	5.79	3.32	8.23	1.24	22.94	31.2
SEP	7.24	3.17	3.08	7.62	1.20	21.42	29.9
OCT	29.24	.63	3.32	8.23	1.24	22.94	25.6
NOV	62.66	.10	3.20	7.93	1.20	22.11	21.9
DEC	117.71	.00	3.20	7.93	1.24	22.25	12.6
YEAR	540.62	22.97	38.54	95.41	14.55	266.75	33.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 154544. BTU/(SQFT-YEAR)

Total Heating energy use for Oct. through April is 528.7 MBtus.  
528.7 MBtus is entered into the Energy Constant Calculation Sheet  
under Heating (MBtus) - BASERUN.

Total Cooling energy use for May through September is  
21,410 kWh. 21,410 kWh is entered into the Energy  
Constant Calculation sheet under Cooling (Kwh) -  
BASERUN.

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

SAMPLE FROM TRACE COMPUTER SIMULATION

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	26,896	68	1,360	3
Feb	24,306	68	1,254	3
March	27,659	68	967	3
April	25,190	68	257	1
May	25,059	69	0	0
June	26,135	73	0	0
July	27,253	75	0	0
Aug	27,290	73	0	0
Sept	24,024	70	0	0
Oct	26,703	68	378	1
Nov	25,906	68	613	2
Dec	26,515	68	1,280	3
Total	312,936	75	6,109	3

Building Energy Consumption = 94,977 (Btu/Sq Ft/Year)  
Source Energy Consumption = 217,655 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

Total gas use for Oct. through April

$$6109 \text{ THERMS} \times \frac{100,000 \text{ BTUs}}{\text{THERM}} \times \frac{1 \text{ MBTU}}{1,000,000} = 610.9 \text{ MBTUs}$$

610.9 MBTUs is entered into the Energy Constant  
Calculation sheet under Heating (MBtu) - BASERUN.

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

SAMPLE FROM TRACE COMPUTER SIMULATION

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													90,948
	ELEC	7678	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	24.1
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	
2	MISC LD													0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	MISC LD													0
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	MISC LD													0
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	MISC LD													0
	P BOTH20	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	MISC LD													0
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ1170S													6,019
	ELEC	0	0	0	0	712	1253	1866	1384	805	0	0	0	8.1
	PK	0.0	0.0	0.0	0.0	5.3	6.9	8.1	6.9	5.6	0.0	0.0	0.0	
1	EQ5200													816
	ELEC	0	0	0	0	96	172	252	188	108	0	0	0	1.1
	PK	0.0	0.0	0.0	0.0	0.8	1.0	1.1	0.9	0.8	0.0	0.0	0.0	
1	EQ5313													691
	ELEC	0	0	0	0	114	125	195	158	99	0	0	0	0.3
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
2	EQ1170S													11,917
	ELEC	0	0	0	0	1783	2537	3091	2652	1854	0	0	0	12.0
	PK	0.0	0.0	0.0	0.0	8.9	10.8	12.0	10.8	9.3	0.0	0.0	0.0	
2	EQ5200													1,576
	ELEC	0	0	0	0	228	341	413	355	239	0	0	0	

Total energy use for chillers  
in this building is inside the  
marked box. Total kWh = 21,900  
21,900 kWh is entered into the  
Energy Constant Calculation Sheet  
under Cooling (kWh).

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

SAMPLE FROM TRACE COMPUTER SIMULATION

PK	0.0	0.0	0.0	0.0	1.3	1.5	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2 EQ5313	CONTROLS												881
ELEC	0	0	0	0	150	169	223	195	144	0	0	0	0.3
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
1 EQ4003	FC CENTRIF. FAN C.V.												11,387
ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	2.2	2.2	2.2	
1 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2 EQ4381	PROPELLER FAN												1,638
ELEC	139	126	139	135	139	135	139	139	135	139	135	139	0.2
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
2 EQ4381	PROPELLER FAN												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3 EQ4003	FC CENTRIF. FAN C.V.												19,605
ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
3 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4 EQ4003	FC CENTRIF. FAN C.V.												11,387
ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	
4 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5 EQ4003	FC CENTRIF. FAN C.V.												32,675
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	3.7
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
5 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1 EQ2001	GAS FIRE TUBE HOT WATER												6,109
GAS	1360	1254	967	257	0	0	0	0	0	378	613	1280	3.4
PK	3.4	3.2	2.6	0.9	0.0	0.0	0.0	0.0	0.0	1.2	1.7	2.8	
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												6,865
ELEC	1110	1003	1110	671	0	0	0	0	0	786	1074	1110	1.5
PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	

**COMPUTER SIMULATIONS**

BUILDING 625

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 625  
BLDG. TYPE: BATTALION HQ

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	528.7	347.3	323.7	323.7	487.0	510.3
COOLING (kWH)	21410	15280	13780	13620	21110	20540

SUPPLY AIR FAN	9430 CFM
FLOOR AREA	5795 FT <sup>2</sup>
CFM1	435 CFM
UA	2216 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1800	55 HR	HR. ON HEATING	1846 HR/YR
SAT.	800	1600	8 HR	HR. ON COOLING	1237 HR/YR
SUN.	800	1600	8 HR	HR. OFF HEATING	2522 HR/YR
	TOTAL OCCUPY HR.		71 HR/WK	HR. OFF COOLING	1691 HR/YR
	TOTAL UNOCC. HR.		97 HR/WK		
	ANNUAL OCCUPY HR.		3702 HR/YR		
	ANNUAL UNOCC. HR.		5058 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 1846 = 2522 HR/YR  
 HOUR SAVE (COOLING ONLY) 2928 - 1237 = 1691 HR/YR

HOAUHC	528.7 MBtu	-	487 MBtu	=	1.90E+01 Btu/CFM-HR
	435 CFM	*	5058 HR/YR		
HOAUH	528.7 MBtu	-	487 MBtu	=	3.80E+01 Btu/CFM-HR
	435 CFM	*	2522 HR/YR		
COAUHC	21410 kWH	-	21110 kWH	=	1.36E-04 kWH/CFM-HR
	435 CFM	*	5058 HR/YR		
COAUC	21410 kWH	-	21110 kWH	=	4.08E-04 kWH/CFM-HR
	435 CFM	*	1691 HR/YR		
HOAOHC	528.7 MBtu	-	510.3 MBtu	=	1.14E+01 Btu/CFM-HR
	435 CFM	*	3702 HR/YR		
HOAOH	528.7 MBtu	-	510.3 MBtu	=	2.29E+01 Btu/CFM-HR
	435 CFM	*	1846 HR/YR		
COAOHC	21410 kWH	-	20540 kWH	=	5.40E-04 kWH/CFM-HR
	435 CFM	*	3702 HR/YR		
COAOC	21410 kWH	-	20540 kWH	=	1.62E-03 kWH/CFM-HR
	435 CFM	*	1237 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				=	0.17



**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 625  
BLDG. TYPE: BATTALION HQ

**ENERGY CONSTANT CALCULATIONS**

ECC	13780 KWH -	13620 KWH	=	1.37E-05 KWH/CFM-HR
	9430 CFM *	1237 HR/YR		
ECHC	13780 KWH -	13620 KWH	=	4.58E-06 KWH/CFM-HR
	9430 CFM *	3702 HR/YR		
NSUCHC	21410 KWH -	15280 KWH	=	1.29E-04 KWH/CFM-HR
	9430 CFM *	5058 HR/YR		
NSUCC	21410 KWH -	15280 KWH	=	3.85E-04 KWH/CFM-HR
	9430 CFM *	1691 HR/YR		
DDCCHC	15280 KWH -	13780 KWH	=	4.30E-05 KWH/CFM-HR
	9430 CFM *	3702 HR/YR		
DDCCC	15280 KWH -	13780 KWH	=	1.29E-04 KWH/CFM-HR
	9430 CFM *	1237 HR/YR		
NSC	528.7 MBtu -	347.31 MBtu	=	8.19E+04 Btu/UA
	2216 UA			
DSC	347.31 MBtu -	323.66 MBtu	=	1.07E+04 Btu/UA
	2216 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -		294 HR/YR	
			=	250 HR/YR
CHWR	(0.915 KW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			
			=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 01-Feb-93

BY: BHS

JOB: 3204.000

CHK:

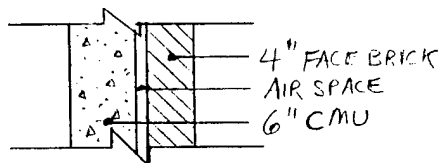
FILE: 625BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

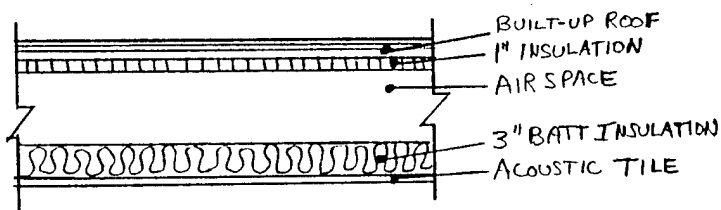
BLDG NO: 625 BLDG NAME: BATTALION HQ  
BLDG FUNCTION: ADMINISTRATION AND CLASSROOMS  
FLOOR AREA: (SQ. FT) 5,795 # FLOORS 1  
SLAB PERIMETER: (FT) 312

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,303	1,135	587	981	4,006
GLASS	(SQ. FT)	180	135	105	90	510
PERSONNEL DOOR	(SQ. FT)	84	0	0	42	126
INSULATED PANEL	(SQ. FT)	117	68	58	234	477
WALLS, NET	(SQ. FT)	922	932	424	615	2,893
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					5,795
INSULATED PANEL	(SQ. FT)	477				
PERSONNEL DOOR	(SQ. FT)					126
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 1" INSULATION	3.32
4. AIR SPACE	0.91
5. 3" BATT INSULATION	11.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	18.20
U=1/R	0.055

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.042	=	0
AVG. WALL H/M/L (SQ.FT.)	L	4006	X CFM / SQ.FT.	0.092	= 369
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	20	X CFM / OPENING /HR	1.600	=	32
DOOR OPENINGS / HR - DOUBLE DOORS	25	X CFM / OPENING /HR	1.385	=	35
TOTAL INFILTRATION (CFM)				=	435

UA PANEL	= PANEL AREA	477	X PANEL "U"	0.238	=	114
UA PDOOR	= PDOOR AREA	126	X DOOR "U"	0.391	=	49
UA WALL	= WALL AREA	2,893	X WALL "U"	0.245	=	709
UA ROOF	= ROOF AREA	5,795	X ROOF "U"	0.055	=	318
UA GLASS	= GLASS AREA	510	X GLASS "U"	0.621	=	317
UA SLAB	= SLAB PERIM.	312	X SLF	0.830	=	259
UA BASEM.	= B-WALL AREA	0	X BASE. "U"	0.000	=	0
INFILTRATION	= CFM	435	X A. T. F.	1.035	=	450

**TOTAL UA (BTU/HR°F) 2,216**

# **EMC Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 01-Feb-93  
 PREPARED BY: AJN  
 CHECKED BY: CEL  
 FILE: 625Z1  
 BLDG: 625 ZONE: 1

## **Rates of Heat Gain from Occupants of Conditioned Spaces**

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat (BTU/H)
1	70	2	Seated very light work (writing)	Offices, hotels, apts	245	155	17,150	10,850
TOTAL	70					TOTAL	17,150	10,850

## **Peak Wattleage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattleage
1	42	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	7,056
	35	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	2,940
	15	18	Incandescent - 60w	60	900
TOTAL	92			TOTAL	10,896

## **Peak Value for Internal Gains**

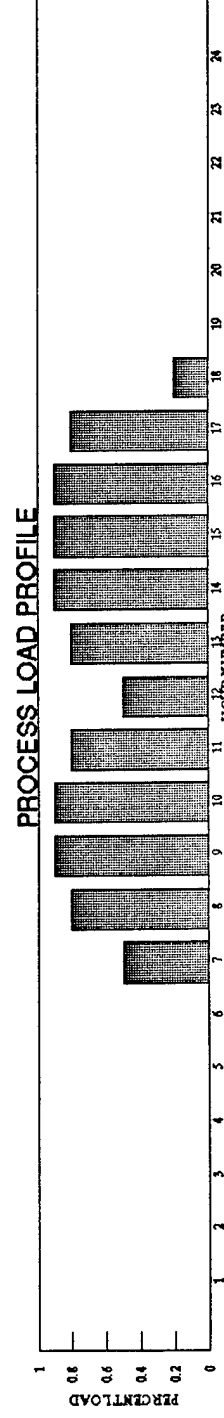
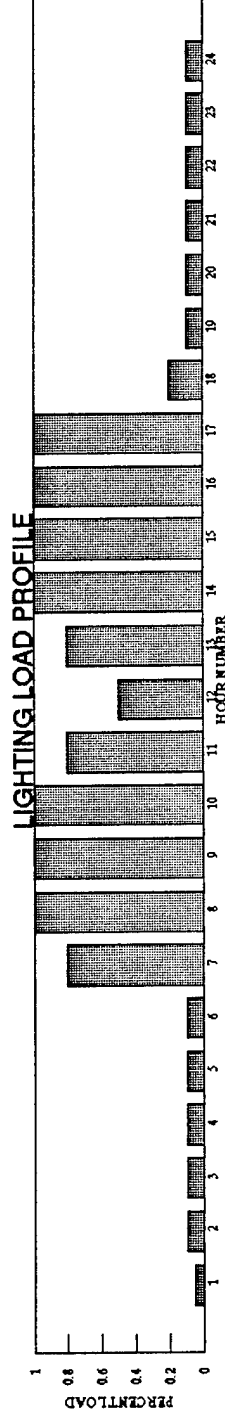
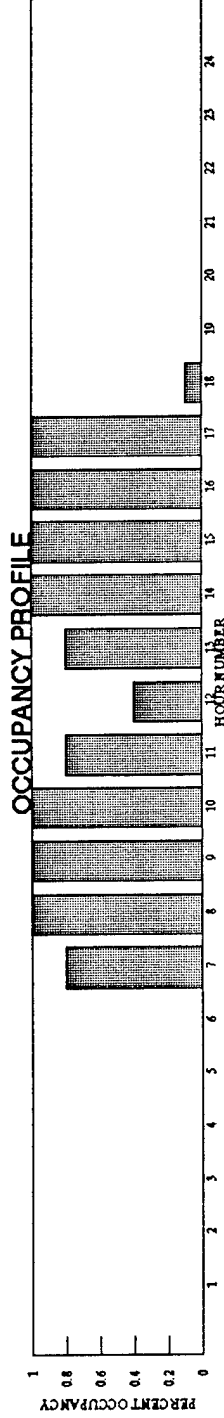
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattleage	Heat Gain to Space (%)	Total Wattleage	Total (BTU)
1	6	62	Television (Color, tube)	300	15%	1,800	6,143
	1	48	Paper Shredder	1,625	20%	1,625	5,546
	4	3	Microcomputer	350	91%	1,400	4,778
	2	12	Typewriter	100	10%	200	683
	2	24	Coffee Maker	1,500	30%	3,000	10,239
	1	10	Copiers (Large)	1,570	20%	1,570	5,358
	2		Overhead Projector	220	80%	440	1,502
TOTAL				TOTAL	34%	10,035	34,249

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 01-Feb-93  
 PREPARED BY: AJN  
 CHECKED BY: CEL  
 FILE: 625Z1  
 BLDG: 625  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	0.8	1	1	1	0.8	0.4	0.8	1	1	1	1	0.1	1	1	0.1	0.1	0.1	0.1
		PROCESS							0.5	0.8	0.9	0.9	0.8	0.5	0.8	0.9	0.9	0.9	0.8	0.2						



BLDG 625 - BATTALION HQ BASERUN

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 5.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 66521.000000

FLOOR AREA (SQFT) 5795.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 272020.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMA) -334850.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 57950.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 435.000000

INFILTRATION PROFILE

.850	.850	.850	.850	.850	.850	.850	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.850	.850	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 3.920000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 69132.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 288.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 49.200000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1000.0	849.0	1039.0	482.0
WINDOW AREA SQFT (AWND)	135.0	90.0	180.0	105.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	13.5	9.0	18.0	10.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.244	.244
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01829	.01829
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00281	.00281
N=3	.01017	.01008	.01012	.01012
N=4	.00498	.00494	.00496	.00496
N=5	.00037	.00036	.00036	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	5795.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.500000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	1.047014E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.106E-04	.156E-02	.582E-02	.287E-02 .212E-03 .106E+04
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.18	.410	-.444E-01 .500E-03 999.
SKYLIGHT TILT DEGREES (TILT)				0.000000E+00
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)				9999.000000
SKYLIGHT HEIGHT FT (SKH)				0.000000E+00
SKYLIGHT WIDTH FT (SKW)				0.000000E+00
SKYLIGHT OVERHANG WIDTH FT (SKOW)				0.000000E+00
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)				0.000000E+00
SKYLIGHT GLASS NUMBER (NS)				1
SKYLIGHT SHADING COEFFICIENT (SHSK)				0.000000E+00
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)				0.000000E+00
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)				1.292998
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)				1.292998
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)				3.400000E-01

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
KW		BTU/HR				
		PEOPLE				
		PEOPLE				
		LATENT				
PEAK VAL	LIGHTS	PROCESS	SENSIBLE		HEATING	COOLING
	11.	11645.	17150.	10850.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.000	.000	.000	70.0	76.0
2	.100	.000	.000	.000	70.0	76.0
3	.100	.000	.000	.000	70.0	76.0
4	.100	.000	.000	.000	70.0	76.0
5	.100	.000	.000	.000	70.0	76.0
6	.100	.000	.000	.000	70.0	76.0
7	.800	.500	.800	.800	70.0	76.0
8	1.000	.800	1.000	1.000	70.0	76.0
9	1.000	.900	1.000	1.000	70.0	76.0
10	1.000	.900	1.000	1.000	70.0	76.0
11	.800	.800	.800	.800	70.0	76.0
12	.500	.500	.400	.400	70.0	76.0

13	.800	.800	.800	.800	70.0	76.0
14	1.000	.900	1.000	1.000	70.0	76.0
15	1.000	.900	1.000	1.000	70.0	76.0
16	1.000	.900	1.000	1.000	70.0	76.0
17	1.000	.800	1.000	1.000	70.0	76.0
18	.200	.200	.100	.100	70.0	76.0
19	.100	.000	.000	.000	70.0	76.0
20	.100	.000	.000	.000	70.0	76.0
21	.100	.000	.000	.000	70.0	76.0
22	.100	.000	.000	.000	70.0	76.0
23	.100	.000	.000	.000	70.0	76.0
24	.100	.000	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					9430.000000	
ECONOMIZER HIGH TEMP LIMIT F					68.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.250000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					274000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					342500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.451
.500	.537	.600	.625	.700	.718	.812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					82936.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			

BLDG 625 - BATTALION HQ      BASERUN

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

			SOLAR	PARTITN					VENT	
MNTH	LOAD		THRU	DOOR	SLAB	BSMT	WALL	WINDOW	AND	LATENT
			WINDOW	AND					INFL	
JAN	.00	GAIN	7.16	.00	.00	.00	.00	.00	.00	.00
	-85.77	LOSS		-9.28	-8.88	.00	-17.29	-7.06	-73.39	.00
FEB	.00	GAIN	9.01	.00	.00	.00	.05	.00	.00	.00
	-66.66	LOSS		-7.65	-7.51	.00	-12.97	-6.00	-62.06	.00
MAR	.76	GAIN	11.47	.04	.00	.00	.75	.00	.00	.00
	-51.92	LOSS		-6.88	-6.97	.00	-10.42	-5.56	-56.21	.00
APR	9.41	GAIN	11.75	.31	.04	.00	2.35	.03	.28	1.72
	-19.95	LOSS		-4.11	-4.14	.00	-5.11	-3.30	-31.68	.00
MAY	23.74	GAIN	12.85	.75	.14	.00	4.40	.11	.88	6.49
	-2.55	LOSS		-2.58	-2.47	.00	-2.13	-1.90	-18.27	.00
JUN	58.86	GAIN	13.02	1.28	.40	.00	6.72	.32	2.63	25.37
	.00	LOSS		-1.46	-1.17	.00	-.61	-.90	-8.51	.00
JUL	83.40	GAIN	13.16	1.93	1.02	.00	9.03	.82	6.91	35.83
	.00	LOSS		-1.05	-.72	.00	-.29	-.56	-5.27	.00
AUG	77.61	GAIN	11.68	1.54	.77	.00	7.57	.60	4.99	35.59
	.00	LOSS		-1.15	-.79	.00	-.35	-.61	-5.17	.00
SEP	42.01	GAIN	9.84	.72	.39	.00	4.39	.32	2.76	19.62
	-3.86	LOSS		-2.27	-1.93	.00	-1.92	-1.52	-14.11	.00
OCT	7.77	GAIN	8.45	.13	.06	.00	1.31	.05	.40	2.52
	-17.33	LOSS		-4.38	-3.94	.00	-5.58	-3.06	-28.47	.00
NOV	1.16	GAIN	6.72	.00	.00	.00	.30	.00	.00	.36
	-41.24	LOSS		-6.18	-5.71	.00	-9.97	-4.45	-43.30	.00
DEC	.00	GAIN	6.26	.00	.00	.00	.01	.00	.00	.00
	-83.93	LOSS		-9.21	-8.69	.00	-17.35	-6.84	-70.36	.00
TOT	305.	GAIN	121.	7.	3.	0.	37.	2.	19.	127.
	-373.	LOSS		-56.	-53.	0.	-84.	-42.	-417.	0.

MAX HEATING LOAD= -272020. BTUH ON DEC 18 HOUR 10      AMBIENT TEMP      6.  
 MAX COOLING LOAD= 283258. BTUH ON JUL 26 HOUR 17      AMBIENT TEMP      93.

ZONE UA BTU/HR-F      1506.6



BLDG 625 - BATTALION HQ      BASERUN

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	678	0	10	0	-.2720E+06	.0000
FEB	559	0	0	0	-.2488E+06	.0000
MAR	516	23	0	0	-.2503E+06	.9976E+05
APR	268	136	0	0	-.1588E+06	.1514E+06
MAY	48	301	0	0	-.1091E+06	.1944E+06
JUN	0	465	0	0	.0000	.2574E+06
JUL	0	587	0	0	.0000	.2833E+06
AUG	0	565	0	0	.0000	.2584E+06
SEP	77	344	0	0	-.1055E+06	.2445E+06
OCT	270	109	0	0	-.1482E+06	.1828E+06
NOV	475	27	0	0	-.2136E+06	.1250E+06
DEC	709	0	14	0	-.2720E+06	.0000
YEAR	3600	2557	24	0	-.2720E+06	.2833E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	118.32	.00	3.32	8.23	1.24	22.94	12.6
FEB	93.14	.00	2.95	7.32	1.12	20.46	12.6
MAR	75.69	.07	3.26	8.08	1.24	22.60	20.5
APR	31.91	.78	3.14	7.77	1.20	21.77	23.5
MAY	4.71	1.85	3.32	8.23	1.24	22.94	26.4
JUN	.00	4.38	3.14	7.77	1.20	21.77	31.1
JUL	.00	6.22	3.26	8.08	1.24	22.60	33.0
AUG	.00	5.79	3.32	8.23	1.24	22.94	31.2
SEP	7.24	3.17	3.08	7.62	1.20	21.42	29.9
OCT	29.24	.63	3.32	8.23	1.24	22.94	25.6
NOV	62.66	.10	3.20	7.93	1.20	22.11	21.9
DEC	117.71	.00	3.20	7.93	1.24	22.25	12.6
YEAR	540.62	22.97	38.54	95.41	14.55	266.75	33.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 154544. BTU/(SQFT-YEAR)

BLDG 625 - BATTALION HQ      BASERUN

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX	SYSTEM	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	INSOL. HORIZ. SURF. BTU/ SQFT- DAY	INSOL. HORIZ. SURF. BTU/ SQFT- DAY		DEG. F	TEMP.	DRIFT	COOL	HEAT	BTU	BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.2488E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.9976E+05	-.2503E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1514E+06	-.1588E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.1944E+06	-.1091E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.2574E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.2833E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.2584E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.2445E+06	-.1055E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.1828E+06	-.1482E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1250E+06	-.2136E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06

BLDG 625 - BATTALION HQ

BASERUN

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	76.	68.	4 27	17 6	62. 4.	3.32	8.23	4.22	22.94
FEB	70.	75.	69.	13 2	17 6	64. 14.	2.95	7.32	3.81	20.46
MAR	71.	77.	69.	12 4	16 6	69. 15.	3.26	8.08	4.22	22.60
APR	73.	78.	69.	30 9	16 6	84. 30.	3.14	7.77	4.08	21.77
MAY	75.	78.	69.	15 11	15 6	80. 39.	3.32	8.23	4.22	22.94
JUN	76.	78.	71.	27 17	15 6	89. 57.	3.14	7.77	4.08	21.77
JUL	77.	78.	72.	3 10	15 6	90. 60.	3.26	8.08	4.22	22.60
AUG	76.	78.	70.	30 25	14 7	87. 55.	3.32	8.23	4.22	22.94
SEP	75.	78.	69.	11 15	15 6	86. 39.	3.08	7.62	4.08	21.42
OCT	73.	78.	69.	5 28	15 6	73. 33.	3.32	8.23	4.22	22.94
NOV	71.	77.	69.	8 3	16 6	75. 18.	3.20	7.93	4.08	22.11
DEC	70.	73.	65.	12 18	16 6	59. 0.	3.20	7.93	4.22	22.25
YEAR							38.54	95.41	49.64	266.75

BLDG 625 - BATTALION HQ NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 5.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955  
 SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 66521.000000  
 FLOOR AREA (SQFT) 5795.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 272020.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -334850.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 57950.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 435.000000  
 INFILTRATION PROFILE  

.850	.850	.850	.850	.850	.850	.850	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.850	.850	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 3.920000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 69132.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 288.000000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 49.200000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1000.0	849.0	1039.0	482.0
WINDOW AREA SQFT (AWND)	135.0	90.0	180.0	105.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	13.5	9.0	18.0	10.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.244	.244
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01829	.01829
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00281	.00281
N=3	.01017	.01008	.01012	.01012
N=4	.00498	.00494	.00496	.00496
N=5	.00037	.00036	.00036	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	5795.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.500000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	1.047014E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.106E-04 .156E-02 .582E-02 .287E-02 .212E-03 .106E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		3.400000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
76.0 76.0 76.0 76.0 76.0 76.0 76.0 76.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				
70.0 70.0 70.0 70.0 70.0 70.0 70.0 70.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

				THERMOSTAT SET POINT DEG F	
KW	BTU/HR				
	PEOPLE	PEOPLE		HEATING	COOLING
LIGHTS	PROCESS	SENSIBLE	LATENT		

PEAK VAL	11.	11645.	17150.	10850.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.000	.000	.000	55.0	90.0	
2	.100	.000	.000	.000	55.0	90.0	
3	.100	.000	.000	.000	55.0	90.0	
4	.100	.000	.000	.000	55.0	90.0	
5	.100	.000	.000	.000	55.0	90.0	
6	.100	.000	.000	.000	55.0	90.0	
7	.800	.500	.800	.800	55.0	90.0	
8	1.000	.800	1.000	1.000	70.0	76.0	
9	1.000	.900	1.000	1.000	70.0	76.0	
10	1.000	.900	1.000	1.000	70.0	76.0	
11	.800	.800	.800	.800	70.0	76.0	
12	.500	.500	.400	.400	70.0	76.0	
13	.800	.800	.800	.800	70.0	76.0	
14	1.000	.900	1.000	1.000	70.0	76.0	
15	1.000	.900	1.000	1.000	70.0	76.0	
16	1.000	.900	1.000	1.000	70.0	76.0	
17	1.000	.800	1.000	1.000	70.0	76.0	
18	.200	.200	.100	.100	55.0	90.0	
19	.100	.000	.000	.000	55.0	90.0	
20	.100	.000	.000	.000	55.0	90.0	
21	.100	.000	.000	.000	55.0	90.0	
22	.100	.000	.000	.000	55.0	90.0	
23	.100	.000	.000	.000	55.0	90.0	
24	.100	.000	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					9430.000000		
ECONOMIZER HIGH TEMP LIMIT F					68.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					8.250000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					274000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					342500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					82936.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 625 - BATTALION HQ NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR	PARTITN					VENT	
			THRU	DOOR					AND	LATENT
			WINDOW	AND	SLAB	BSMT	WALL	WINDOW	INFL	
				ROOF						
JAN	.00	GAIN	7.16	.00	.00	.00	.00	.00	.00	.00
	-60.42	LOSS		-7.65	-7.14	.00	-13.07	-5.68	-57.41	.00
FEB	.00	GAIN	9.01	.00	.00	.00	.12	.00	.00	.00
	-46.47	LOSS		-6.33	-6.10	.00	-9.61	-4.88	-49.14	.00
MAR	.57	GAIN	11.47	.05	.00	.00	.92	.00	.01	.00
	-34.86	LOSS		-5.79	-5.81	.00	-7.77	-4.64	-45.67	.00
APR	7.32	GAIN	11.75	.32	.05	.00	2.43	.04	.33	1.38
	-12.30	LOSS		-3.65	-3.66	.00	-3.98	-2.93	-27.48	.00
MAY	20.10	GAIN	12.85	.72	.13	.00	4.19	.10	.83	5.23
	-1.09	LOSS		-2.68	-2.60	.00	-2.26	-2.00	-18.39	.00
JUN	46.56	GAIN	13.02	1.20	.38	.00	6.11	.30	2.47	17.17
	.00	LOSS		-1.74	-1.53	.00	-.93	-1.17	-10.34	.00
JUL	58.04	GAIN	13.16	1.75	.88	.00	7.79	.70	5.99	17.92
	.00	LOSS		-1.47	-1.21	.00	-.59	-.94	-8.53	.00
AUG	54.70	GAIN	11.68	1.42	.71	.00	6.62	.55	4.60	18.42
	.00	LOSS		-1.53	-1.26	.00	-.69	-.97	-8.03	.00
SEP	31.14	GAIN	9.84	.68	.37	.00	4.06	.30	2.58	11.94
	-1.70	LOSS		-2.37	-2.05	.00	-1.95	-1.61	-14.54	.00
OCT	6.24	GAIN	8.45	.14	.07	.00	1.40	.06	.47	1.90
	-10.50	LOSS		-3.99	-3.51	.00	-4.63	-2.73	-24.97	.00
NOV	.95	GAIN	6.72	.00	.00	.00	.35	.00	.00	.28
	-27.26	LOSS		-5.26	-4.73	.00	-7.65	-3.69	-34.97	.00
DEC	.00	GAIN	6.26	.00	.00	.00	.03	.00	.00	.00
	-59.50	LOSS		-7.57	-6.95	.00	-13.13	-5.47	-54.74	.00
TOT	226.	GAIN	121.	6.	3.	0.	34.	2.	17.	74.
	-254.	LOSS		-50.	-47.	0.	-66.	-37.	-354.	0.

MAX HEATING LOAD= -272020. BTUH ON DEC 31 HOUR 9 AMBIENT TEMP 38.  
 MAX COOLING LOAD= 334850. BTUH ON JUL 16 HOUR 8 AMBIENT TEMP 82.

ZONE UA BTU/HR-F 1506.6



BLDG 625 - BATTALION HQ NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	63.	75.	54.	4 29	17 6	62. 13.	3.32	8.23	4.22	22.94
FEB	64.	74.	54.	13 2	17 6	64. 14.	2.95	7.32	3.81	20.46
MAR	66.	78.	54.	28 4	19 6	68. 15.	3.26	8.08	4.22	22.60
APR	71.	80.	55.	30 9	21 6	71. 30.	3.14	7.77	4.08	21.77
MAY	75.	80.	61.	29 11	22 6	68. 39.	3.32	8.23	4.22	22.94
JUN	78.	82.	72.	30 17	24 6	75. 57.	3.14	7.77	4.08	21.77
JUL	79.	85.	73.	16 24	3 6	80. 66.	3.26	8.08	4.22	22.60
AUG	79.	82.	71.	1 25	7 7	76. 55.	3.32	8.23	4.22	22.94
SEP	76.	82.	62.	2 15	24 7	76. 44.	3.08	7.62	4.08	21.42
OCT	71.	79.	55.	4 28	21 8	69. 38.	3.32	8.23	4.22	22.94
NOV	67.	77.	54.	8 3	16 6	75. 18.	3.20	7.93	4.08	22.11
DEC	63.	72.	54.	12 18	17 6	52. 0.	3.20	7.93	4.22	22.25
YEAR							38.54	95.41	49.64	266.75

BLDG 625 - BATTALION HQ NIGHT SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	425	0	93	0	-.2720E+06	.0000
FEB	328	0	72	0	-.2720E+06	.0000
MAR	266	11	49	0	-.2720E+06	.9391E+05
APR	108	81	22	0	-.2720E+06	.1518E+06
MAY	12	192	0	0	-.2424E+06	.1947E+06
JUN	0	269	0	0	.0000	.2869E+06
JUL	0	288	0	2	.0000	.3349E+06
AUG	0	283	0	0	.0000	.3240E+06
SEP	20	188	0	0	-.2265E+06	.3230E+06
OCT	96	66	13	0	-.2720E+06	.1829E+06
NOV	231	17	41	0	-.2720E+06	.1254E+06
DEC	426	0	93	0	-.2720E+06	.0000
YEAR	1912	1395	383	2	-.2720E+06	.3349E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	82.23	.00	3.32	8.23	1.24	22.94	12.6
FEB	63.47	.00	2.95	7.32	1.12	20.46	12.6
MAR	48.38	.05	3.26	8.08	1.24	22.60	20.1
APR	17.73	.58	3.14	7.77	1.20	21.77	23.6
MAY	1.66	1.52	3.32	8.23	1.24	22.94	26.4
JUN	.00	3.37	3.14	7.77	1.20	21.77	33.3
JUL	.00	4.19	3.26	8.08	1.24	22.60	36.0
AUG	.00	3.94	3.32	8.23	1.24	22.94	35.5
SEP	2.63	2.26	3.08	7.62	1.20	21.42	35.5
OCT	15.30	.48	3.32	8.23	1.24	22.94	25.6
NOV	38.84	.08	3.20	7.93	1.20	22.11	21.9
DEC	81.36	.00	3.20	7.93	1.24	22.25	12.6
YEAR	351.60	16.47	38.54	95.41	14.55	266.75	36.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 118102. BTU/(SQFT-YEAR)

BLDG 625 - BATTALION HQ

NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX TEMP.	SYSTEM DRIFT	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY		DEG. F	DEG. F + -	COOL	HEAT	BTU	BTU	
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.2720E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.9391E+05	-.2720E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1518E+06	-.2720E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.1947E+06	-.2424E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.2869E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.3349E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.3240E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.3230E+06	-.2265E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.1829E+06	-.2720E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1254E+06	-.2720E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06

BLDG 625 - BATTALION HQ DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 5.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALPHA) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 66521.000000

FLOOR AREA (SQFT) 5795.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 272020.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -334850.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 57950.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 435.000000

INFILTRATION PROFILE

.850	.850	.850	.850	.850	.850	.850	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.850	.850	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 3.920000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 69132.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 288.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 49.200000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1000.0	849.0	1039.0	482.0
WINDOW AREA SQFT (AWND)	135.0	90.0	180.0	105.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	13.5	9.0	18.0	10.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.244	.244
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01829	.01829
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00281	.00281
N=3	.01017	.01008	.01012	.01012
N=4	.00498	.00494	.00496	.00496
N=5	.00037	.00036	.00036	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	5795.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.500000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.047014E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.106E-04 .156E-02 .582E-02 .287E-02 .212E-03 .106E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		3.400000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
78.0 78.0 78.0 78.0 78.0 78.0 78.0 78.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				
68.0 68.0 68.0 68.0 68.0 68.0 68.0 68.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	- - - - -	BTU/HR	- - - - -		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	11.	11645.	17150.	10850.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.000	.000	.000	55.0	90.0	
2	.100	.000	.000	.000	55.0	90.0	
3	.100	.000	.000	.000	55.0	90.0	
4	.100	.000	.000	.000	55.0	90.0	
5	.100	.000	.000	.000	55.0	90.0	
6	.100	.000	.000	.000	55.0	90.0	
7	.800	.500	.800	.800	55.0	90.0	
8	1.000	.800	1.000	1.000	68.0	78.0	
9	1.000	.900	1.000	1.000	68.0	78.0	
10	1.000	.900	1.000	1.000	68.0	78.0	
11	.800	.800	.800	.800	68.0	78.0	
12	.500	.500	.400	.400	68.0	78.0	
13	.800	.800	.800	.800	68.0	78.0	
14	1.000	.900	1.000	1.000	68.0	78.0	
15	1.000	.900	1.000	1.000	68.0	78.0	
16	1.000	.900	1.000	1.000	68.0	78.0	
17	1.000	.800	1.000	1.000	68.0	78.0	
18	.200	.200	.100	.100	55.0	90.0	
19	.100	.000	.000	.000	55.0	90.0	
20	.100	.000	.000	.000	55.0	90.0	
21	.100	.000	.000	.000	55.0	90.0	
22	.100	.000	.000	.000	55.0	90.0	
23	.100	.000	.000	.000	55.0	90.0	
24	.100	.000	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					9430.000000		
ECONOMIZER HIGH TEMP LIMIT F					68.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					8.250000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					274000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					342500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					82936.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 625 - BATTALION HQ DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00 GAIN	7.16	.00	.00	.00	.01	.00	.00	.00
	-57.15 LOSS		-7.43	-6.91	.00	-12.52	-5.50	-55.40	.00
FEB	.00 GAIN	9.01	.00	.00	.00	.17	.00	.00	.00
	-43.37 LOSS		-6.11	-5.88	.00	-9.11	-4.70	-47.21	.00
MAR	.23 GAIN	11.47	.06	.00	.00	1.02	.00	.03	.00
	-31.42 LOSS		-5.59	-5.59	.00	-7.33	-4.46	-43.76	.00
APR	5.20 GAIN	11.75	.31	.03	.00	2.37	.03	.25	1.19
	-10.27 LOSS		-3.63	-3.64	.00	-3.88	-2.92	-27.19	.00
MAY	16.66 GAIN	12.85	.63	.07	.00	3.83	.06	.45	4.74
	-.59 LOSS		-2.82	-2.79	.00	-2.50	-2.15	-19.18	.00
JUN	42.09 GAIN	13.02	1.04	.25	.00	5.50	.20	1.61	16.74
	.00 LOSS		-1.92	-1.75	.00	-1.19	-1.35	-11.66	.00
JUL	53.12 GAIN	13.16	1.56	.70	.00	7.09	.56	4.73	17.34
	.00 LOSS		-1.64	-1.40	.00	-.80	-1.09	-9.65	.00
AUG	50.07 GAIN	11.68	1.25	.53	.00	5.93	.41	3.42	18.14
	.00 LOSS		-1.71	-1.45	.00	-.92	-1.12	-9.28	.00
SEP	27.39 GAIN	9.84	.60	.28	.00	3.71	.23	1.99	11.42
	-.88 LOSS		-2.50	-2.19	.00	-2.14	-1.72	-15.28	.00
OCT	4.49 GAIN	8.45	.13	.06	.00	1.40	.05	.39	1.39
	-8.04 LOSS		-3.91	-3.43	.00	-4.45	-2.67	-24.11	.00
NOV	.55 GAIN	6.72	.00	.00	.00	.39	.00	.01	.19
	-24.19 LOSS		-5.08	-4.53	.00	-7.21	-3.54	-33.24	.00
DEC	.00 GAIN	6.26	.00	.00	.00	.05	.00	.01	.00
	-56.08 LOSS		-7.33	-6.70	.00	-12.54	-5.27	-52.63	.00
TOT	200. GAIN	121.	6.	2.	0.	31.	2.	13.	71.
	-232. LOSS		-50.	-46.	0.	-65.	-36.	-349.	0.

MAX HEATING LOAD= -272020. BTUH ON DEC 31 HOUR 9 AMBIENT TEMP 38.  
 MAX COOLING LOAD= 334850. BTUH ON JUL 16 HOUR 8 AMBIENT TEMP 82.

ZONE UA BTU/HR-F 1506.6



## BEACON Energy Analysis By Energy Systems Engineers, Inc.

625-1.I

BLDG 625 - BATTALION HQ

DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	62.	74.	54.	4 29	17 6	62. 13.	3.32	8.23	4.22	22.94
FEB	63.	73.	54.	13 2	17 6	64. 14.	2.95	7.32	3.81	20.46
MAR	65.	79.	54.	12 4	17 6	64. 15.	3.26	8.08	4.22	22.60
APR	71.	81.	55.	30 9	21 6	71. 30.	3.14	7.77	4.08	21.77
MAY	76.	82.	61.	29 11	21 6	70. 39.	3.32	8.23	4.22	22.94
JUN	79.	83.	73.	30 17	23 6	75. 57.	3.14	7.77	4.08	21.77
JUL	81.	86.	74.	16 24	2 6	82. 66.	3.26	8.08	4.22	22.60
AUG	80.	83.	72.	12 25	23 7	76. 55.	3.32	8.23	4.22	22.94
SEP	76.	83.	62.	2 15	23 7	78. 44.	3.08	7.62	4.08	21.42
OCT	71.	80.	55.	4 28	20 7	72. 34.	3.32	8.23	4.22	22.94
NOV	66.	79.	54.	8 3	16 6	75. 18.	3.20	7.93	4.08	22.11
DEC	62.	71.	54.	12 18	17 6	52. 0.	3.20	7.93	4.22	22.25
YEAR							38.54	95.41	49.64	266.75

BLDG 625 - BATTALION HQ DDC (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	438	0	72	0	-.2720E+06	.0000
FEB	326	0	57	0	-.2720E+06	.0000
MAR	255	6	38	0	-.2720E+06	.6870E+05
APR	103	56	12	0	-.2720E+06	.1426E+06
MAY	9	163	0	0	-.1881E+06	.1864E+06
JUN	0	261	0	0	.0000	.2499E+06
JUL	0	280	0	1	.0000	.3349E+06
AUG	0	277	0	0	.0000	.2872E+06
SEP	13	168	0	0	-.1764E+06	.2833E+06
OCT	85	45	7	0	-.2720E+06	.1743E+06
NOV	224	6	31	0	-.2720E+06	.1127E+06
DEC	435	0	74	0	-.2720E+06	.0000
YEAR	1888	1262	291	1	-.2720E+06	.3349E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	79.07	.00	3.32	8.23	1.24	22.94	12.6
FEB	59.74	.00	2.95	7.32	1.12	20.46	12.6
MAR	44.08	.02	3.26	8.08	1.24	22.60	18.7
APR	15.37	.42	3.14	7.77	1.20	21.77	23.0
MAY	1.06	1.28	3.32	8.23	1.24	22.94	25.8
JUN	.00	3.06	3.14	7.77	1.20	21.77	30.5
JUL	.00	3.84	3.26	8.08	1.24	22.60	36.0
AUG	.00	3.61	3.32	8.23	1.24	22.94	33.3
SEP	1.49	1.99	3.08	7.62	1.20	21.42	33.0
OCT	12.24	.35	3.32	8.23	1.24	22.94	25.0
NOV	35.25	.04	3.20	7.93	1.20	22.11	21.2
DEC	77.93	.00	3.20	7.93	1.24	22.25	12.6
YEAR	326.21	14.62	38.54	95.41	14.55	266.75	36.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR      112629. BTU/(SQFT-YEAR)

BLDG 625 - BATTALION HQ DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX SYSTEM TEMP. DRIFT DEG. F +      -	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU	
	INSOL. HORIZ. SURF. BTU/ SQFT- DAY	INSOL. HORIZ. SURF. BTU/ SQFT- DAY				COOL	HEAT			
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.2720E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.6870E+05	-.2720E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1426E+06	-.2720E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.1864E+06	-.1881E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.2499E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.3349E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.2872E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.2833E+06	-.1764E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.1743E+06	-.2720E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1127E+06	-.2720E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06

BLDG 625 - BATTALION HQ ECONOMIZER (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 5.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 66521.000000  
 FLOOR AREA (SQFT) 5795.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 272020.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMA) -334850.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 57950.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 435.000000

## INFILTRATION PROFILE

.850	.850	.850	.850	.850	.850	.850	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.850	.850	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 3.920000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 69132.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 288.000000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 49.200000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1000.0	849.0	1039.0	482.0
WINDOW AREA SQFT (AWND)	135.0	90.0	180.0	105.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	13.5	9.0	18.0	10.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.244	.244
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01829	.01829
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00281	.00281
N=3	.01017	.01008	.01012	.01012
N=4	.00498	.00494	.00496	.00496
N=5	.00037	.00036	.00036	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	5795.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.500000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	1.047014E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.106E-04	.156E-02	.582E-02	.287E-02 .212E-03 .106E+04
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.18	.410	-.444E-01 .500E-03 999.
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			3.400000E-01	
WEEKEND COOLING THERMOSTAT PROFILE				
90.0	90.0	90.0	90.0	90.0 90.0 90.0 90.0
78.0	78.0	78.0	78.0	78.0 78.0 78.0 78.0
90.0	90.0	90.0	90.0	90.0 90.0 90.0 90.0
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0 55.0 55.0 55.0
68.0	68.0	68.0	68.0	68.0 68.0 68.0 68.0
55.0	55.0	55.0	55.0	55.0 55.0 55.0 55.0

-----INTERNAL GAINS AND PROFILES -----

KW - - - - - BTU/HR - - - - -				THERMOSTAT SET POINT DEG F	
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	11.	11645.	17150.	10850.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.000	.000	.000	55.0	90.0
2	.100	.000	.000	.000	55.0	90.0
3	.100	.000	.000	.000	55.0	90.0
4	.100	.000	.000	.000	55.0	90.0
5	.100	.000	.000	.000	55.0	90.0
6	.100	.000	.000	.000	55.0	90.0
7	.800	.500	.800	.800	55.0	90.0
8	1.000	.800	1.000	1.000	68.0	78.0
9	1.000	.900	1.000	1.000	68.0	78.0
10	1.000	.900	1.000	1.000	68.0	78.0
11	.800	.800	.800	.800	68.0	78.0
12	.500	.500	.400	.400	68.0	78.0
13	.800	.800	.800	.800	68.0	78.0
14	1.000	.900	1.000	1.000	68.0	78.0
15	1.000	.900	1.000	1.000	68.0	78.0
16	1.000	.900	1.000	1.000	68.0	78.0
17	1.000	.800	1.000	1.000	68.0	78.0
18	.200	.200	.100	.100	55.0	90.0
19	.100	.000	.000	.000	55.0	90.0
20	.100	.000	.000	.000	55.0	90.0
21	.100	.000	.000	.000	55.0	90.0
22	.100	.000	.000	.000	55.0	90.0
23	.100	.000	.000	.000	55.0	90.0
24	.100	.000	.000	.000	55.0	90.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					9430.000000	
ECONOMIZER HIGH TEMP LIMIT F					72.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.250000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					274000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					342500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					82936.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 625 - BATTALION HQ ECONOMIZER (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	7.16	.00	.00	.00	.01	.00	.00	.00
	-57.15	LOSS		-7.43	-6.91	.00	-12.52	-5.50	-55.40	.00
FEB	.00	GAIN	9.01	.00	.00	.00	.17	.00	.00	.00
	-43.37	LOSS		-6.11	-5.88	.00	-9.11	-4.70	-47.21	.00
MAR	.13	GAIN	11.47	.06	.00	.00	1.02	.00	.03	.00
	-31.42	LOSS		-5.59	-5.59	.00	-7.33	-4.46	-43.86	.00
APR	4.67	GAIN	11.75	.31	.03	.00	2.37	.03	.25	1.05
	-10.27	LOSS		-3.63	-3.64	.00	-3.88	-2.92	-27.59	.00
MAY	16.03	GAIN	12.85	.63	.07	.00	3.83	.06	.45	4.71
	-.59	LOSS		-2.82	-2.79	.00	-2.50	-2.15	-19.78	.00
JUN	42.14	GAIN	13.02	1.04	.25	.00	5.50	.20	1.61	17.61
	.00	LOSS		-1.92	-1.75	.00	-1.19	-1.35	-12.49	.00
JUL	52.98	GAIN	13.16	1.56	.70	.00	7.09	.56	4.73	17.57
	.00	LOSS		-1.64	-1.40	.00	-.80	-1.09	-10.03	.00
AUG	49.79	GAIN	11.68	1.25	.53	.00	5.93	.41	3.42	18.20
	.00	LOSS		-1.71	-1.45	.00	-.92	-1.12	-9.62	.00
SEP	26.52	GAIN	9.84	.60	.28	.00	3.71	.23	1.99	11.24
	-.88	LOSS		-2.50	-2.19	.00	-2.14	-1.72	-15.98	.00
OCT	4.62	GAIN	8.45	.13	.06	.00	1.40	.05	.39	1.67
	-8.04	LOSS		-3.91	-3.43	.00	-4.45	-2.67	-24.26	.00
NOV	.54	GAIN	6.72	.00	.00	.00	.39	.00	.01	.23
	-24.19	LOSS		-5.08	-4.53	.00	-7.21	-3.54	-33.29	.00
DEC	.00	GAIN	6.26	.00	.00	.00	.05	.00	.01	.00
	-56.08	LOSS		-7.33	-6.70	.00	-12.54	-5.27	-52.63	.00
TOT	197.	GAIN	121.	6.	2.	0.	31.	2.	13.	72.
	-232.	LOSS		-50.	-46.	0.	-65.	-36.	-352.	0.

MAX HEATING LOAD= -272020. BTUH ON DEC 31 HOUR 9 AMBIENT TEMP 38.  
 MAX COOLING LOAD= 334850. BTUH ON SEP 12 HOUR 8 AMBIENT TEMP 72.

ZONE UA BTU/HR-F 1506.6



## BEACON Energy Analysis By Energy Systems Engineers, Inc.

625-3.I

BLDG 625 - BATTALION HQ ECONOMIZER (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	62.	74.	54.	4 29	17 6	62. 13.	3.32	8.23	4.22	22.94
FEB	63.	73.	54.	13 2	17 6	64. 14.	2.95	7.32	3.81	20.46
MAR	65.	79.	54.	12 4	17 6	64. 15.	3.26	8.08	4.22	22.60
APR	71.	81.	55.	30 9	21 6	71. 30.	3.14	7.77	4.08	21.77
MAY	76.	82.	61.	29 11	21 6	70. 39.	3.32	8.23	4.22	22.94
JUN	79.	83.	73.	30 17	23 6	75. 57.	3.14	7.77	4.08	21.77
JUL	81.	86.	74.	16 24	2 6	82. 66.	3.26	8.08	4.22	22.60
AUG	80.	83.	72.	12 25	23 7	76. 55.	3.32	8.23	4.22	22.94
SEP	76.	83.	62.	2 15	23 7	78. 44.	3.08	7.62	4.08	21.42
OCT	71.	80.	55.	4 28	20 7	72. 34.	3.32	8.23	4.22	22.94
NOV	66.	79.	54.	8 3	16 6	75. 18.	3.20	7.93	4.08	22.11
DEC	62.	71.	54.	12 18	17 6	52. 0.	3.20	7.93	4.22	22.25
YEAR							38.54	95.41	49.64	266.75

BLDG 625 - BATTALION HQ ECONOMIZER (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	438	0	72	0	-.2720E+06	.0000
FEB	326	0	57	0	-.2720E+06	.0000
MAR	255	6	38	0	-.2720E+06	.6870E+05
APR	103	56	12	0	-.2720E+06	.1531E+06
MAY	9	163	0	0	-.1881E+06	.2531E+06
JUN	0	261	0	0	.0000	.3251E+06
JUL	0	280	0	2	.0000	.3349E+06
AUG	0	277	0	1	.0000	.3349E+06
SEP	13	168	0	1	-.1764E+06	.3349E+06
OCT	85	45	7	0	-.2720E+06	.2928E+06
NOV	224	6	31	0	-.2720E+06	.1127E+06
DEC	435	0	74	0	-.2720E+06	.0000
YEAR	1888	1262	291	4	-.2720E+06	.3349E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	79.07	.00	3.32	8.23	1.24	22.94	12.6
FEB	59.74	.00	2.95	7.32	1.12	20.46	12.6
MAR	44.08	.01	3.26	8.08	1.24	22.60	18.7
APR	15.37	.37	3.14	7.77	1.20	21.77	23.0
MAY	1.06	1.23	3.32	8.23	1.24	22.94	30.8
JUN	.00	3.05	3.14	7.77	1.20	21.77	34.4
JUL	.00	3.83	3.26	8.08	1.24	22.60	36.0
AUG	.00	3.59	3.32	8.23	1.24	22.94	36.0
SEP	1.49	1.92	3.08	7.62	1.20	21.42	36.0
OCT	12.24	.35	3.32	8.23	1.24	22.94	33.7
NOV	35.25	.04	3.20	7.93	1.20	22.11	21.2
DEC	77.93	.00	3.20	7.93	1.24	22.25	12.6
YEAR	326.21	14.40	38.54	95.41	14.55	266.75	36.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 112498. BTU/(SQFT-YEAR)

BLDG 625 - BATTALION HQ ECONOMIZER (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	WHEN LOADS MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.2720E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.6870E+05	-.2720E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1531E+06	-.2720E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.2531E+06	-.1881E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.3251E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.3349E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.3349E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.3349E+06	-.1764E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.2928E+06	-.2720E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1127E+06	-.2720E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06

BLDG 625 - BATTALION HQ OUTSIDE AIR (NIGHTIME) (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 5.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO  
 STATION 13995 YEAR 1955  
 SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 66521.000000  
 FLOOR AREA (SQFT) 5795.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 272020.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -334850.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 57950.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 435.000000  
 INFILTRATION PROFILE  

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 3.920000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 69132.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 288.000000  
 PARTITION UA FACTOR BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 49.200000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1000.0	849.0	1039.0	482.0
WINDOW AREA SQFT (AWND)	135.0	90.0	180.0	105.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	13.5	9.0	18.0	10.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.244	.244
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01829	.01829
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00281	.00281
N=3	.01017	.01008	.01012	.01012
N=4	.00498	.00494	.00496	.00496
N=5	.00037	.00036	.00036	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	5795.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.500000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	1.047014E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.106E-04 .156E-02 .582E-02 .287E-02 .212E-03 .106E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			3.400000E-01	

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
					HEATING	COOLING
KW	PEOPLE	PEOPLE				
LIGHTS	PROCESS	SENSIBLE	LATENT			
PEAK VAL	11.	11645.	17150.	10850.		
HOURLY FRACTION OF PEAK						
1	.100	.000	.000	.000	70.0	76.0
2	.100	.000	.000	.000	70.0	76.0
3	.100	.000	.000	.000	70.0	76.0
4	.100	.000	.000	.000	70.0	76.0
5	.100	.000	.000	.000	70.0	76.0
6	.100	.000	.000	.000	70.0	76.0
7	.800	.500	.800	.800	70.0	76.0
8	1.000	.800	1.000	1.000	70.0	76.0
9	1.000	.900	1.000	1.000	70.0	76.0
10	1.000	.900	1.000	1.000	70.0	76.0
11	.800	.800	.800	.800	70.0	76.0
12	.500	.500	.400	.400	70.0	76.0

13	.800	.800	.800	.800	70.0	76.0
14	1.000	.900	1.000	1.000	70.0	76.0
15	1.000	.900	1.000	1.000	70.0	76.0
16	1.000	.900	1.000	1.000	70.0	76.0
17	1.000	.800	1.000	1.000	70.0	76.0
18	.200	.200	.100	.100	70.0	76.0
19	.100	.000	.000	.000	70.0	76.0
20	.100	.000	.000	.000	70.0	76.0
21	.100	.000	.000	.000	70.0	76.0
22	.100	.000	.000	.000	70.0	76.0
23	.100	.000	.000	.000	70.0	76.0
24	.100	.000	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					9430.000000	
ECONOMIZER HIGH TEMP LIMIT F					68.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.250000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					274000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					342500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					82936.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 625 - BATTALION HQ      OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR	PARTITN		DOOR		VENT		LATENT
			THRU	ROOF	SLAB	BSMT	WALL	WINDOW	AND	
			WINDOW						INFL	
JAN	.00	GAIN	7.16	.00	.00	.00	.00	.00	.00	.00
	-78.60	LOSS		-9.29	-8.89	.00	-17.31	-7.07	-66.17	.00
FEB	.00	GAIN	9.01	.00	.00	.00	.05	.00	.00	.00
	-60.65	LOSS		-7.66	-7.52	.00	-12.99	-6.00	-56.00	.00
MAR	.77	GAIN	11.47	.04	.00	.00	.74	.00	.00	.00
	-46.40	LOSS		-6.90	-6.99	.00	-10.45	-5.57	-50.59	.00
APR	9.64	GAIN	11.75	.31	.04	.00	2.32	.03	.27	1.68
	-17.15	LOSS		-4.14	-4.17	.00	-5.17	-3.33	-28.42	.00
MAY	24.35	GAIN	12.85	.75	.14	.00	4.36	.11	.83	6.43
	-1.85	LOSS		-2.62	-2.52	.00	-2.22	-1.94	-16.58	.00
JUN	58.23	GAIN	13.02	1.28	.40	.00	6.69	.32	2.53	24.10
	.00	LOSS		-1.48	-1.19	.00	-.64	-.91	-7.64	.00
JUL	80.66	GAIN	13.16	1.93	1.02	.00	9.02	.82	6.54	32.93
	.00	LOSS		-1.06	-.73	.00	-.31	-.57	-4.67	.00
AUG	75.26	GAIN	11.68	1.54	.77	.00	7.55	.60	4.72	32.87
	.00	LOSS		-1.17	-.81	.00	-.37	-.62	-4.47	.00
SEP	41.21	GAIN	9.84	.71	.39	.00	4.38	.32	2.66	18.51
	-2.83	LOSS		-2.29	-1.96	.00	-1.98	-1.54	-12.52	.00
OCT	8.06	GAIN	8.45	.13	.06	.00	1.29	.05	.40	2.58
	-14.58	LOSS		-4.42	-3.97	.00	-5.65	-3.09	-25.31	.00
NOV	1.21	GAIN	6.72	.00	.00	.00	.30	.00	.00	.38
	-36.71	LOSS		-6.20	-5.73	.00	-10.01	-4.47	-38.64	.00
DEC	.00	GAIN	6.26	.00	.00	.00	.01	.00	.00	.00
	-76.91	LOSS		-9.22	-8.70	.00	-17.38	-6.85	-63.28	.00
TOT	299.	GAIN	121.	7.	3.	0.	37.	2.	18.	119.
	-336.	LOSS		-56.	-53.	0.	-84.	-42.	-374.	0.

MAX HEATING LOAD= -272020. BTUH ON DEC 18 HOUR 8      AMBIENT TEMP 1.  
 MAX COOLING LOAD= 280783. BTUH ON JUL 27 HOUR 15      AMBIENT TEMP 92.

ZONE UA BTU/HR-F      1506.6



BLDG 625 - BATTALION HQ      OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	76.	69.	4 27	17 6	62. 4.	3.32	8.23	4.22	22.94
FEB	70.	75.	69.	13 2	17 6	64. 14.	2.95	7.32	3.81	20.46
MAR	71.	77.	69.	12 4	15 6	72. 15.	3.26	8.08	4.22	22.60
APR	73.	78.	69.	30 9	16 6	84. 30.	3.14	7.77	4.08	21.77
MAY	75.	78.	69.	15 11	15 6	80. 39.	3.32	8.23	4.22	22.94
JUN	76.	78.	72.	27 17	15 6	89. 57.	3.14	7.77	4.08	21.77
JUL	77.	78.	73.	3 10	15 6	90. 60.	3.26	8.08	4.22	22.60
AUG	77.	78.	71.	30 25	14 7	87. 55.	3.32	8.23	4.22	22.94
SEP	75.	78.	69.	11 15	15 6	86. 39.	3.08	7.62	4.08	21.42
OCT	73.	78.	69.	5 28	15 6	73. 33.	3.32	8.23	4.22	22.94
NOV	71.	77.	69.	8 3	16 6	75. 18.	3.20	7.93	4.08	22.11
DEC	70.	73.	68.	12 18	17 6	52. 0.	3.20	7.93	4.22	22.25
YEAR							38.54	95.41	49.64	266.75

BLDG 625 - BATTALION HQ      OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	674	0	1	0	-.2720E+06	.0000
FEB	554	0	0	0	-.2257E+06	.0000
MAR	501	24	0	0	-.2277E+06	.9980E+05
APR	252	146	0	0	-.1425E+06	.1516E+06
MAY	38	321	0	0	-.9629E+05	.1945E+06
JUN	0	484	0	0	.0000	.2574E+06
JUL	0	601	0	0	.0000	.2808E+06
AUG	0	583	0	0	.0000	.2584E+06
SEP	66	353	0	0	-.9263E+05	.2445E+06
OCT	255	118	0	0	-.1323E+06	.1829E+06
NOV	461	31	0	0	-.1918E+06	.1254E+06
DEC	705	0	8	0	-.2720E+06	.0000
YEAR	3506	2661	9	0	-.2720E+06	.2808E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	110.27	.00	3.32	8.23	1.24	22.94	12.6
FEB	86.34	.00	2.95	7.32	1.12	20.46	12.6
MAR	69.15	.07	3.26	8.08	1.24	22.60	20.5
APR	28.30	.80	3.14	7.77	1.20	21.77	23.5
MAY	3.55	1.90	3.32	8.23	1.24	22.94	26.4
JUN	.00	4.35	3.14	7.77	1.20	21.77	31.1
JUL	.00	6.06	3.26	8.08	1.24	22.60	32.8
AUG	.00	5.67	3.32	8.23	1.24	22.94	31.2
SEP	5.75	3.13	3.08	7.62	1.20	21.42	29.9
OCT	25.77	.65	3.32	8.23	1.24	22.94	25.6
NOV	57.32	.10	3.20	7.93	1.20	22.11	21.9
DEC	109.81	.00	3.20	7.93	1.24	22.25	12.6
YEAR	496.27	22.74	38.54	95.41	14.55	266.75	32.8

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 146758. BTU/(SQFT-YEAR)

BLDG 625 - BATTALION HQ      OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	DAY	DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.2257E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.9980E+05	-.2277E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1516E+06	-.1425E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.1945E+06	-.9629E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.2574E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.2808E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.2584E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.2445E+06	-.9263E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.1829E+06	-.1323E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1254E+06	-.1918E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06

BLDG 625 - BATTALION HQ OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 5.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 66521.000000

FLOOR AREA (SQFT) 5795.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 272020.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -334850.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 57950.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 435.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 3.920000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 69132.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 288.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 49.200000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1000.0	849.0	1039.0	482.0
WINDOW AREA SQFT (AWND)	135.0	90.0	180.0	105.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	13.5	9.0	18.0	10.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.244	.244
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01829	.01829
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00281	.00281
N=3	.01017	.01008	.01012	.01012
N=4	.00498	.00494	.00496	.00496
N=5	.00037	.00036	.00036	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	5795.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.500000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.047014E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.106E-04 .156E-02 .582E-02 .287E-02 .212E-03 .106E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		3.400000E-01		

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL HOUR	KW	BTU/HR				HEATING	COOLING
	LIGHTS	PROCESS	SENSIBLE	LATENT			
	11.	11645.	17150.	10850.			
	HOURLY FRACTION OF PEAK						
1	.100	.000	.000	.000	70.0	76.0	
2	.100	.000	.000	.000	70.0	76.0	
3	.100	.000	.000	.000	70.0	76.0	
4	.100	.000	.000	.000	70.0	76.0	
5	.100	.000	.000	.000	70.0	76.0	
6	.100	.000	.000	.000	70.0	76.0	
7	.800	.500	.800	.800	70.0	76.0	
8	1.000	.800	1.000	1.000	70.0	76.0	
9	1.000	.900	1.000	1.000	70.0	76.0	
10	1.000	.900	1.000	1.000	70.0	76.0	
11	.800	.800	.800	.800	70.0	76.0	
12	.500	.500	.400	.400	70.0	76.0	

13	.800	.800	.800	.800	70.0	76.0
14	1.000	.900	1.000	1.000	70.0	76.0
15	1.000	.900	1.000	1.000	70.0	76.0
16	1.000	.900	1.000	1.000	70.0	76.0
17	1.000	.800	1.000	1.000	70.0	76.0
18	.200	.200	.100	.100	70.0	76.0
19	.100	.000	.000	.000	70.0	76.0
20	.100	.000	.000	.000	70.0	76.0
21	.100	.000	.000	.000	70.0	76.0
22	.100	.000	.000	.000	70.0	76.0
23	.100	.000	.000	.000	70.0	76.0
24	.100	.000	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					9430.000000	
ECONOMIZER HIGH TEMP LIMIT F					68.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.250000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					274000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					342500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.451
.500	.537	.600	.625	.700	.718	.812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					82936.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			

BLDG 625 - BATTALION HQ      OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
			THRU WINDOW							
JAN	.00	GAIN	7.16	.00	.00	.00	.00	.00	.00	.00
	-82.60	LOSS		-9.29	-8.89	.00	-17.31	-7.07	-70.18	.00
FEB	.00	GAIN	9.01	.00	.00	.00	.05	.00	.00	.00
	-64.09	LOSS		-7.67	-7.53	.00	-13.00	-6.01	-59.40	.00
MAR	.79	GAIN	11.47	.04	.00	.00	.74	.00	.00	.00
	-49.87	LOSS		-6.89	-6.99	.00	-10.45	-5.57	-54.05	.00
APR	9.43	GAIN	11.75	.31	.04	.00	2.33	.03	.24	1.58
	-19.34	LOSS		-4.12	-4.15	.00	-5.13	-3.31	-30.81	.00
MAY	22.93	GAIN	12.85	.75	.14	.00	4.40	.11	.74	5.78
	-2.60	LOSS		-2.58	-2.47	.00	-2.13	-1.90	-18.28	.00
JUN	55.84	GAIN	13.02	1.28	.40	.00	6.73	.32	2.22	22.80
	.00	LOSS		-1.46	-1.16	.00	-.60	-.89	-8.58	.00
JUL	80.36	GAIN	13.16	1.93	1.02	.00	9.03	.82	5.99	33.74
	.00	LOSS		-1.05	-.72	.00	-.29	-.56	-5.31	.00
AUG	74.31	GAIN	11.68	1.54	.77	.00	7.57	.60	4.28	33.03
	-.01	LOSS		-1.15	-.79	.00	-.35	-.61	-5.23	.00
SEP	39.80	GAIN	9.84	.71	.39	.00	4.39	.32	2.35	17.78
	-3.91	LOSS		-2.27	-1.94	.00	-1.93	-1.52	-14.11	.00
OCT	7.57	GAIN	8.45	.13	.06	.00	1.30	.05	.33	2.31
	-16.86	LOSS		-4.40	-3.96	.00	-5.61	-3.08	-27.82	.00
NOV	1.20	GAIN	6.72	.00	.00	.00	.30	.00	.00	.35
	-39.78	LOSS		-6.20	-5.72	.00	-9.99	-4.46	-41.72	.00
DEC	.00	GAIN	6.26	.00	.00	.00	.01	.00	.00	.00
	-80.85	LOSS		-9.21	-8.69	.00	-17.35	-6.84	-67.27	.00
TOT	292.	GAIN	121.	7.	3.	0.	37.	2.	16.	117.
	-360.	LOSS		-56.	-53.	0.	-84.	-42.	-403.	0.

MAX HEATING LOAD= -272020. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 282976. BTUH ON JUL 26 HOUR 17      AMBIENT TEMP 93.

ZONE UA BTU/HR-F      1506.6



## BEACON Energy Analysis By Energy Systems Engineers, Inc.

625-5.I

BLDG 625 - BATTALION HQ      OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F		DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	76. 67.	4 27	17 6	62. 4.	3.32	8.23	4.22	22.94
FEB	70.	75. 69.	13 2	17 6	64. 14.	2.95	7.32	3.81	20.46
MAR	71.	77. 69.	12 4	16 6	69. 15.	3.26	8.08	4.22	22.60
APR	73.	78. 69.	30 9	16 6	84. 30.	3.14	7.77	4.08	21.77
MAY	75.	78. 69.	15 11	15 6	80. 39.	3.32	8.23	4.22	22.94
JUN	76.	78. 71.	27 17	15 6	89. 57.	3.14	7.77	4.08	21.77
JUL	77.	78. 72.	3 10	15 6	90. 60.	3.26	8.08	4.22	22.60
AUG	76.	78. 70.	30 25	14 7	87. 55.	3.32	8.23	4.22	22.94
SEP	75.	78. 69.	11 15	15 6	86. 39.	3.08	7.62	4.08	21.42
OCT	73.	78. 69.	5 28	15 6	73. 33.	3.32	8.23	4.22	22.94
NOV	71.	77. 69.	8 3	16 6	75. 18.	3.20	7.93	4.08	22.11
DEC	70.	73. 65.	12 18	16 6	59. 0.	3.20	7.93	4.22	22.25
YEAR						38.54	95.41	49.64	266.75

BLDG 625 - BATTALION HQ      OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING	NUMBER OF HOURS WHEN		MAXIMUM LOADS	
		INCLUDING ECONOMIZER	LOADS WERE NOT MET		BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	668	1	10	0	-.2720E+06	.0000
FEB	547	0	0	0	-.2529E+06	.0000
MAR	492	23	0	0	-.2543E+06	.1004E+06
APR	253	140	0	0	-.1617E+06	.1465E+06
MAY	48	297	0	0	-.1113E+06	.1888E+06
JUN	0	463	0	0	.0000	.2462E+06
JUL	0	585	0	0	.0000	.2830E+06
AUG	1	564	0	0	-9340.	.2476E+06
SEP	75	345	0	0	-.1077E+06	.2385E+06
OCT	256	114	0	0	-.1510E+06	.1715E+06
NOV	457	32	0	0	-.2174E+06	.1210E+06
DEC	691	0	13	0	-.2720E+06	.0000
YEAR	3488	2564	23	0	-.2720E+06	.2830E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	114.68	.00	3.32	8.23	1.24	22.94	12.6
FEB	89.98	.00	2.95	7.32	1.12	20.46	12.6
MAR	72.59	.07	3.26	8.08	1.24	22.60	20.5
APR	30.64	.78	3.14	7.77	1.20	21.77	23.2
MAY	4.77	1.80	3.32	8.23	1.24	22.94	26.0
JUN	.00	4.17	3.14	7.77	1.20	21.77	30.3
JUL	.00	6.00	3.26	8.08	1.24	22.60	33.0
AUG	.07	5.56	3.32	8.23	1.24	22.94	30.4
SEP	7.21	3.01	3.08	7.62	1.20	21.42	29.7
OCT	28.21	.62	3.32	8.23	1.24	22.94	24.8
NOV	60.42	.10	3.20	7.93	1.20	22.11	21.7
DEC	113.74	.00	3.20	7.93	1.24	22.25	12.6
YEAR	522.31	22.12	38.54	95.41	14.55	266.75	33.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 150884. BTU/(SQFT-YEAR)

BLDG 625 - BATTALION HQ      OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY		+	-	COOL	HEAT			
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.2529E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.1004E+06	-.2543E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1465E+06	-.1617E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.1888E+06	-.1113E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.2462E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.2830E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.2476E+06	-9340.
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.2385E+06	-.1077E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.1715E+06	-.1510E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1210E+06	-.2174E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2720E+06

**COMPUTER SIMULATIONS**

BUILDING 630

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 630Z1  
BLDG. TYPE: MESS HALL (KITCHEN)

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1782.3	1654.1	1548.9		1743.9	1760.4
COOLING (kWH)						

SUPPLY AIR FAN	16500 CFM
FLOOR AREA	3801 FT <sup>2</sup>
CFM1	357 CFM
UA	1480 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	300	2000	85 HR	HR. ON HEATING	3094 HR/YR
SAT.	300	2000	17 HR	HR. ON COOLING	2074 HR/YR
SUN.	300	2000	17 HR	HR. OFF HEATING	1274 HR/YR
	TOTAL OCCUPY HR.		119 HR/WK	HR. OFF COOLING	854 HR/YR
	TOTAL UNOCC. HR.		49 HR/WK		
	ANNUAL OCCUPY HR.		6205 HR/YR		
	ANNUAL UNOCC. HR.		2555 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 3094 = 1274 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 2074 = 854 HR/YR

HOAUHC	1782.3 MBtu	-	1743.9 MBtu	=	4.21E+01 Btu/CFM-HR
	357 CFM	*	2555 HR/YR		
HOAUH	1782.3 MBtu	-	1743.9 MBtu	=	8.44E+01 Btu/CFM-HR
	357 CFM	*	1274 HR/YR		
COAUHC	0 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	357 CFM	*	2555 HR/YR		
COAUH	0 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	357 CFM	*	854 HR/YR		
HOAOHC	1782.3 MBtu	-	1760.4 MBtu	=	9.89E+00 Btu/CFM-HR
	357 CFM	*	6205 HR/YR		
HOAOH	1782.3 MBtu	-	1760.4 MBtu	=	1.98E+01 Btu/CFM-HR
	357 CFM	*	3094 HR/YR		
COAOHC	0 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	357 CFM	*	6205 HR/YR		
COAOH	0 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	357 CFM	*	2074 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 630Z1  
BLDG. TYPE: MESS HALL (KITCHEN)

**ENERGY CONSTANT CALCULATIONS**

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	16500 CFM *	2074 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	16500 CFM *	6205 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	16500 CFM *	2555 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	16500 CFM *	854 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	16500 CFM *	6205 HR/YR		
DDCCO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	16500 CFM *	2074 HR/YR		
NSC	1782.3 MBtu -	1654.1 MBtu	=	8.66E+04 Btu/UA
		1480 UA		
DSC	1654.1 MBtu -	1548.9 MBtu	=	7.11E+04 Btu/UA
		1480 UA		
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG.: DOUG CAGE  
 LOCATION: FT LEONARD WOOD

DATE: 02-Feb-93  
 BY: BHS  
 JOB: 3204.000  
 CHK:  
 FILE: 630Z1BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

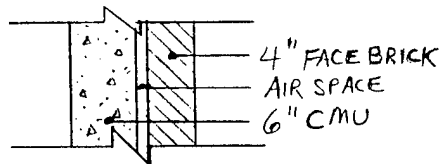
BLDG NO: 630 BLDG NAME: MESS HALL - ZONE 1  
 BLDG FUNCTION: KITCHEN AREA  
 FLOOR AREA: (SQ. FT) 3,801 # FLOORS 1  
 SLAB PERIMETER: (FT) 159

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	1,530	666	666	2,862
GLASS	(SQ. FT)	0	127	35	28	190
PERSONNEL DOOR	(SQ. FT)	0	42	21	42	105
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	1,361	610	596	2,567
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					3,801
OVERHEAD DOOR	(SQ. FT)	0				
PERSONNEL DOOR	(SQ. FT)					105
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

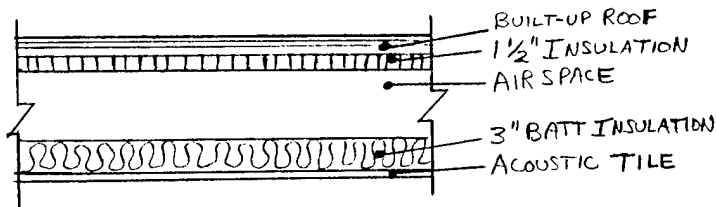
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 1.5" INSULATION	4.98
4. CEILING AIR SPACE	1.00
5. 3" INSULATION	11.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	19.95
U=1/R	0.050

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	2862	X CFM / SQ.FT.	0.115	= 329
LEAKY WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR		X CFM / OPENING / HF	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	20	X CFM / OPENING / HF	1.385	=	28
		TOTAL INFILTRATION (CFM)		=	357

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	105	X DOOR 'U'	0.391	=	41
UA WALL	= WALL AREA	2,567	X WALL 'U'	0.245	=	629
UA ROOF	= ROOF AREA	3,801	X ROOF 'U'	0.050	=	191
UA GLASS	= GLASS AREA	190	X GLASS 'U'	0.621	=	118
UA SLAB	= SLAB PERIM.	159	X SLF	0.830	=	132
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	357	X A. T. F.	1.035	=	369

TOTAL UA (BTU/HR°F) 1,480



# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 03-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 630Z1  
 BLDG: 630 ZONE: 1

## **Rates of Heat Gain from Occupants of Conditioned Spaces**

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat (BTU/H)
1	20	5	Standing, light work, or walking slowly	Retail store, bank	270	220	5,400	4,400
TOTAL	20					TOTAL	5,400	4,400

## **Peak Wattage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	23	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	3,864
	16	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	1,344
TOTAL	39			TOTAL	5,208

## **Peak Value for Internal Gains**

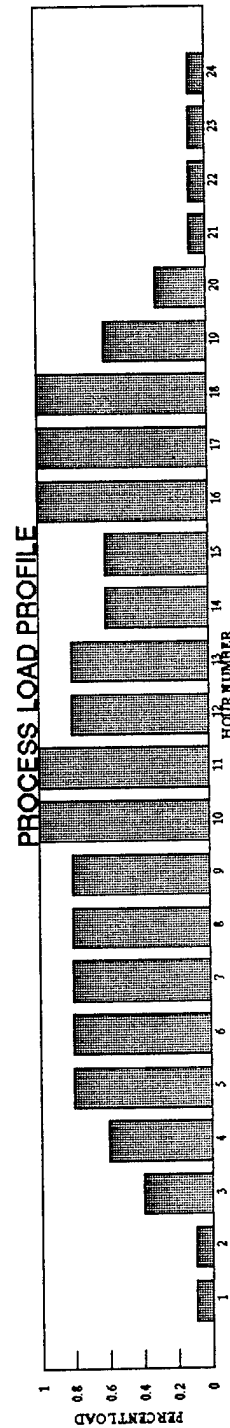
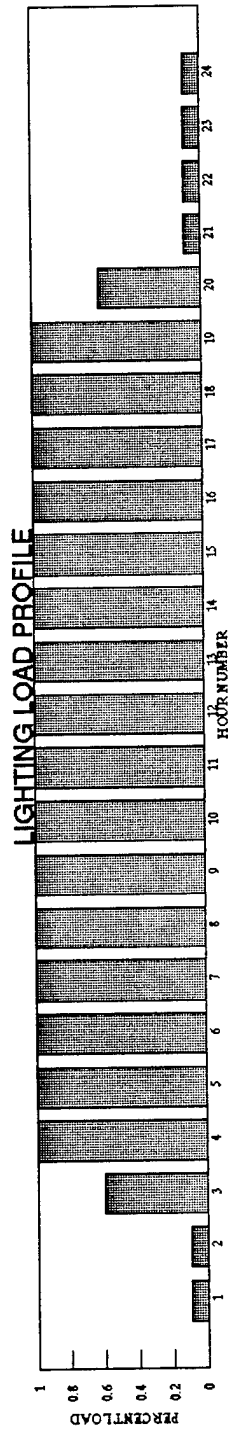
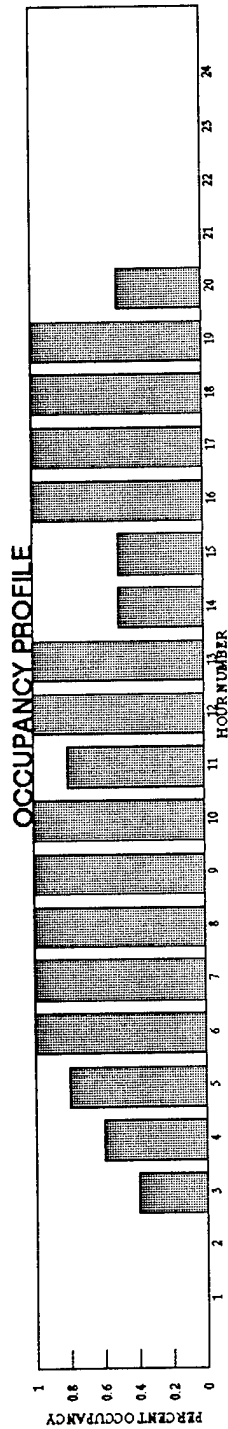
Zone No.	No. of Equipments	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
1	3	89	Refrigerator (large), per 100 cu.ft. of space	220	40%	660	2,253
	6	99	Range (burners), per 2 burner section	2,101		12,606	43,024
	4	95	Fryer (deep fat), per lb. of fat capacity	372		1,488	5,079
	2	83	Freezer (large)	1,340	40%	2,680	9,147
	1	115	Steam Kettle, per quart capacity	146	13%	146	498
	5	88	Mixer (large), per quart of capacity	28	100%	140	478
	2	97	Oven (large convection), per cu.ft. of oven space	1,304		2,608	8,901
	1	73	Blender, per quart of capacity	454	98%	454	1,550
	2	114	Dishwasher (conveyor water sanitizing), per 100 dish/hr.	346	44%	692	2,362
	2	87	Microwave oven (Heavy duty commercial)	2,628	100%	5,256	17,939
TOTAL				TOTAL	28%	26,730	91,229

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 03-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 630Z1  
 BLDG: 630  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	Mess Hall	OCCUPANCY			0.4	0.6	0.8	1	1	1	1	1	0.8	1	1	0.5	0.5	1	1	1	1	1	0.5			
		LIGHTING	0.1	0.1	0.6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.4	0.6	0.8	0.8	0.8	0.8	0.8	1	1	0.8	0.8	0.6	0.6	1	1	1	1	0.6	0.3	0.1	0.1	0.1



BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO  
 STATION 13995 YEAR 1955  
 SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 40515.000000  
 FLOOR AREA (SQFT) 3801.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1128650.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 76020.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 357.000000  
 INFILTRATION PROFILE  
 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00  
 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00  
 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00  
 A FACTOR IN INFILTRATION EQUATION (CINA) 5.290000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 24800.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 159.000000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 41.000000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1361.0	596.0	.0	610.0
WINDOW AREA SQFT (AWND)	127.0	28.0	.0	35.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	12.7	2.8	.0	3.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3801.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		2.800000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
	KW	BTU/HR				
		PEOPLE	PEOPLE			
		SENSIBLE	LATENT		HEATING	COOLING
PEAK VAL	LIGHTS	PROCESS	PEOPLE	PEOPLE		
	5.	25544.	5400.	4400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.100	.000	.000	60.0	.0
2	.100	.100	.000	.000	60.0	.0
3	.600	.400	.400	.400	60.0	.0
4	1.000	.600	.600	.600	60.0	.0
5	1.000	.800	.800	.800	60.0	.0
6	1.000	.800	1.000	1.000	60.0	.0
7	1.000	.800	1.000	1.000	60.0	.0
8	1.000	.800	1.000	1.000	60.0	.0
9	1.000	.800	1.000	1.000	60.0	.0
10	1.000	1.000	1.000	1.000	60.0	.0
11	1.000	1.000	.800	.800	60.0	.0
12	1.000	.800	1.000	1.000	60.0	.0

13	1.000	.800	1.000	1.000	60.0	.0
14	1.000	.600	.500	.500	60.0	.0
15	1.000	.600	.500	.500	60.0	.0
16	1.000	1.000	1.000	1.000	60.0	.0
17	1.000	1.000	1.000	1.000	60.0	.0
18	1.000	1.000	1.000	1.000	60.0	.0
19	1.000	.600	1.000	1.000	60.0	.0
20	.600	.300	.500	.500	60.0	.0
21	.100	.100	.000	.000	60.0	.0
22	.100	.100	.000	.000	60.0	.0
23	.100	.100	.000	.000	60.0	.0
24	.100	.100	.000	.000	60.0	.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					16500.000000	
ECONOMIZER HIGH TEMP LIMIT F					100.000000	
SYSTEM SUPPLY AIR START TIME HR					1.000000	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1128650.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					1410813.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10	
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -244.	GAIN LOSS	3.	0. -4.	0. -4.	0. 0.	0. -8.	0. -2.	0. -262.	0. 0.
FEB	0. -201.	GAIN LOSS	4.	0. -3.	0. -3.	0. 0.	1. -6.	0. -2.	0. -219.	0. 0.
MAR	0. -177.	GAIN LOSS	4.	0. -3.	0. -3.	0. 0.	1. -5.	0. -2.	0. -202.	0. 0.
APR	.00 -60.00	GAIN LOSS	4.34	.27 -1.85	.01 -1.73	.00 .00	2.67 -2.20	.01 -.87	.88 -90.68	.00 .00
MAY	.00 -14.80	GAIN LOSS	4.70	.40 -1.25	.02 -1.14	.00 .00	3.69 -.98	.01 -.55	1.27 -51.07	.00 .00
JUN	.00 -.11	GAIN LOSS	4.70	.45 -1.12	.01 -1.06	.00 .00	3.83 -.85	.01 -.52	.99 -34.84	.00 .00
JUL	.00 -.01	GAIN LOSS	4.77	.50 -1.19	.01 -1.11	.00 .00	3.86 -1.03	.01 -.55	1.21 -37.00	.00 .00
AUG	.00 .00	GAIN LOSS	4.34	.43 -1.13	.01 -.99	.00 .00	3.66 -.79	.01 -.48	.97 -36.54	.00 .00
SEP	.00 -12.52	GAIN LOSS	3.90	.24 -1.45	.02 -1.22	.00 .00	2.87 -1.24	.01 -.60	1.50 -45.20	.00 .00
OCT	.00 -55.30	GAIN LOSS	3.60	.11 -1.93	.01 -1.54	.00 .00	1.94 -2.22	.00 -.75	.73 -86.00	.00 .00
NOV	0. -126.	GAIN LOSS	3.	0. -3.	0. -2.	0. 0.	1. -4.	0. -1.	0. -150.	0. 0.
DEC	0. -273.	GAIN LOSS	3.	0. -4.	0. -4.	0. 0.	0. -9.	0. -2.	0. -287.	0. 0.
TOT	0. -1164.	GAIN LOSS	48.	3. -28.	0. -25.	0. 0.	26. -41.	0. -12.	8. -1501.	0. 0.

MAX HEATING LOAD= -1128650. BTUH ON DEC 18 HOUR 9 AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 977.8

BEACON Energy Analysis By Energy Systems Engineers, Inc.

630A.I

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	68.	59.	4 29	13 2	64. 9.	2.87	40.44	8.39	32.05
FEB	61.	75.	59.	17 2	18 2	44. 15.	2.60	36.53	6.98	28.35
MAR	63.	85.	59.	11 14	18 2	63. 21.	2.87	40.44	7.14	30.80
APR	68.	93.	60.	7 9	19 2	65. 33.	2.78	39.14	6.38	29.28
MAY	73.	102.	60.	27 11	19 2	76. 39.	2.87	40.44	6.67	30.33
JUN	80.	104.	60.	30 19	19 2	82. 57.	2.78	39.14	6.06	28.95
JUL	85.	114.	60.	15 10	19 5	87. 57.	2.87	40.44	6.35	30.01
AUG	83.	109.	62.	12 24	19 24	84. 59.	2.87	40.44	6.63	30.29
SEP	77.	110.	60.	2 26	19 2	83. 45.	2.78	39.14	5.83	28.73
OCT	67.	92.	60.	14 11	19 1	71. 36.	2.87	40.44	6.81	30.47
NOV	64.	83.	59.	17 2	19 24	59. 20.	2.78	39.14	6.90	29.80
DEC	61.	78.	53.	23 18	19 7	54. -1.	2.87	40.44	6.90	30.56
YEAR							33.84	476.17	81.04	359.62

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED			NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER		HEATING	COOLING	HEATING	COOLING
JAN	659	0		0	0	-.1077E+07	.0000
FEB	549	0		0	0	-.9416E+06	.0000
MAR	533	0		0	0	-.8468E+06	.0000
APR	276	0		0	0	-.5748E+06	.0000
MAY	119	0		0	0	-.4008E+06	.0000
JUN	6	0		0	0	-.4727E+05	.0000
JUL	1	0		0	0	-9145.	.0000
AUG	0	0		0	0	.0000	.0000
SEP	110	0		0	0	-.2719E+06	.0000
OCT	323	0		0	0	-.4969E+06	.0000
NOV	425	0		0	0	-.8096E+06	.0000
DEC	570	0		12	0	-.1129E+07	.0000
YEAR	3571	0		12	0	-.1129E+07	.0000



## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	376.26	.00	2.87	40.44	2.46	32.05	8.7
FEB	307.47	.00	2.60	36.53	2.05	28.35	8.7
MAR	278.64	.00	2.87	40.44	2.09	30.80	8.7
APR	110.41	.00	2.78	39.14	1.87	29.28	8.7
MAY	38.36	.00	2.87	40.44	1.95	30.33	8.7
JUN	1.61	.00	2.78	39.14	1.77	28.95	8.7
JUL	.27	.00	2.87	40.44	1.86	30.01	8.7
AUG	.00	.00	2.87	40.44	1.94	30.29	8.7
SEP	32.80	.00	2.78	39.14	1.71	28.73	8.7
OCT	116.05	.00	2.87	40.44	2.00	30.47	8.7
NOV	207.40	.00	2.78	39.14	2.02	29.80	8.7
DEC	386.02	.00	2.87	40.44	2.02	30.56	8.7
YEAR	1855.29	.00	33.84	476.17	23.75	359.62	8.7

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 665084. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF	AVG. AMBT. DEG. F	MAX SYSTEM TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET	COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1077E+07	
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.9416E+06	
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.8468E+06	
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5748E+06	
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.4008E+06	
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	-.4727E+05	
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	-9145.	
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000	
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2719E+06	
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4969E+06	
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.8096E+06	
DEC	856.	586.	1.000	35.	0.	0.	0	12	.0000	-.1129E+07	

BLDG 630 - MESS HALL KITCHEN ZONE 1 NIGHT SETBACK (FT LEONARD WOOD)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 2  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 40515.000000

FLOOR AREA (SQFT) 3801.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1128650.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 76020.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 357.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.290000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 24800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 159.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 41.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1361.0	596.0	.0	610.0
WINDOW AREA SQFT (AWND)	127.0	28.0	.0	35.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	12.7	2.8	.0	3.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

		KW		BTU/HR			
				PEOPLE	PEOPLE		
		LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL		5.	25544.	5400.	4400.		
HOUR		HOURLY FRACTION OF PEAK					
1		.100	.100	.000	.000	55.0	.0
2		.100	.100	.000	.000	55.0	.0
3		.600	.400	.400	.400	55.0	.0
4		1.000	.600	.600	.600	60.0	.0
5		1.000	.800	.800	.800	60.0	.0

6	1.000	.800	1.000	1.000	60.0	.0	
7	1.000	.800	1.000	1.000	60.0	.0	
8	1.000	.800	1.000	1.000	60.0	.0	
9	1.000	.800	1.000	1.000	60.0	.0	
10	1.000	1.000	1.000	1.000	60.0	.0	
11	1.000	1.000	.800	.800	60.0	.0	
12	1.000	.800	1.000	1.000	60.0	.0	
13	1.000	.800	1.000	1.000	60.0	.0	
14	1.000	.600	.500	.500	60.0	.0	
15	1.000	.600	.500	.500	60.0	.0	
16	1.000	1.000	1.000	1.000	60.0	.0	
17	1.000	1.000	1.000	1.000	60.0	.0	
18	1.000	1.000	1.000	1.000	60.0	.0	
19	1.000	.600	1.000	1.000	60.0	.0	
20	.600	.300	.500	.500	60.0	.0	
21	.100	.100	.000	.000	55.0	.0	
22	.100	.100	.000	.000	55.0	.0	
23	.100	.100	.000	.000	55.0	.0	
24	.100	.100	.000	.000	55.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					16500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					1.000000		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP (TMXAIR)					65.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1128650.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					1410813.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 630 - MESS HALL KITCHEN ZONE 1 NIGHT SETBACK (FT LEONARD WOOD)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-228.	LOSS		-4.	-4.	0.	-8.	-2.	-247.	0.
FEB	0.	GAIN	4.	0.	0.	0.	1.	0.	0.	0.
	-187.	LOSS		-3.	-3.	0.	-6.	-2.	-206.	0.
MAR	0.	GAIN	4.	0.	0.	0.	1.	0.	0.	0.
	-162.	LOSS		-3.	-3.	0.	-4.	-1.	-188.	0.
APR	.00	GAIN	4.34	.27	.01	.00	2.74	.01	.91	.00
	-52.77	LOSS		-1.76	-1.64	.00	-1.99	-.82	-83.87	.00
MAY	.00	GAIN	4.70	.40	.02	.00	3.74	.01	1.27	.00
	-10.79	LOSS		-1.20	-1.10	.00	-.90	-.53	-47.31	.00
JUN	.00	GAIN	4.70	.45	.01	.00	3.83	.01	.99	.00
	.00	LOSS		-1.12	-1.06	.00	-.85	-.51	-34.74	.00
JUL	.00	GAIN	4.77	.50	.01	.00	3.86	.01	1.21	.00
	-.01	LOSS		-1.19	-1.11	.00	-1.03	-.55	-37.00	.00
AUG	.00	GAIN	4.34	.43	.01	.00	3.66	.01	.97	.00
	.00	LOSS		-1.13	-.99	.00	-.79	-.48	-36.54	.00
SEP	.00	GAIN	3.90	.24	.02	.00	2.95	.01	1.49	.00
	-7.95	LOSS		-1.40	-1.16	.00	-1.14	-.58	-40.94	.00
OCT	.00	GAIN	3.60	.11	.01	.00	2.01	.00	.77	.00
	-45.36	LOSS		-1.82	-1.43	.00	-1.96	-.69	-76.83	.00
NOV	0.	GAIN	3.	0.	0.	0.	1.	0.	0.	0.
	-114.	LOSS		-3.	-2.	0.	-4.	-1.	-139.	0.
DEC	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-258.	LOSS		-4.	-4.	0.	-8.	-2.	-273.	0.
TOT	0.	GAIN	48.	3.	0.	0.	26.	0.	8.	0.
	-1066.	LOSS		-27.	-24.	0.	-38.	-12.	-1409.	0.

MAX HEATING LOAD= -1128650. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F

977.8

BLDG 630 - MESS HALL KITCHEN ZONE 1 NIGHT SETBACK (FT LEONARD WOOD)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	59.	68.	54.	4 29	13 2	64. 9.	2.87	40.44	8.21	31.87
FEB	60.	75.	54.	17 2	18 2	44. 15.	2.60	36.53	6.86	28.23
MAR	62.	85.	54.	11 14	18 2	63. 21.	2.87	40.44	7.13	30.79
APR	67.	93.	55.	7 11	19 2	65. 33.	2.78	39.14	6.33	29.23
MAY	73.	102.	55.	27 11	19 2	76. 39.	2.87	40.44	6.68	30.34
JUN	80.	104.	59.	30 19	19 2	82. 57.	2.78	39.14	6.06	28.95
JUL	85.	114.	60.	15 10	19 5	87. 57.	2.87	40.44	6.35	30.01
AUG	83.	109.	62.	12 24	19 24	84. 59.	2.87	40.44	6.63	30.29
SEP	76.	110.	55.	2 26	19 2	83. 45.	2.78	39.14	5.83	28.73
OCT	67.	92.	55.	14 11	19 1	71. 36.	2.87	40.44	6.81	30.47
NOV	63.	83.	55.	17 2	19 24	59. 20.	2.78	39.14	6.77	29.66
DEC	60.	78.	53.	23 18	19 7	54. -1.	2.87	40.44	6.79	30.45
YEAR							33.84	476.17	80.45	359.03

BLDG 630 - MESS HALL KITCHEN ZONE 1 NIGHT SETBACK (FT LEONARD WOOD)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED			NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER		HEATING	COOLING	HEATING	COOLING
JAN	631	0		0	0	-.1002E+07	.0000
FEB	535	0		0	0	-.9449E+06	.0000
MAR	523	0		0	0	-.8501E+06	.0000
APR	244	0		0	0	-.5946E+06	.0000
MAY	98	0		0	0	-.3835E+06	.0000
JUN	1	0		0	0	-120.6	.0000
JUL	1	0		0	0	-9145.	.0000
AUG	0	0		0	0	.0000	.0000
SEP	91	0		0	0	-.2810E+06	.0000
OCT	296	0		0	0	-.4872E+06	.0000
NOV	388	0		0	0	-.7357E+06	.0000
DEC	560	0		6	0	-.1129E+07	.0000
YEAR	3368	0		6	0	-.1129E+07	.0000



## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	351.68	.00	2.87	40.44	2.41	31.87	8.7
FEB	289.80	.00	2.60	36.53	2.01	28.23	8.7
MAR	259.78	.00	2.87	40.44	2.09	30.79	8.7
APR	97.68	.00	2.78	39.14	1.86	29.23	8.7
MAY	29.71	.00	2.87	40.44	1.96	30.34	8.7
JUN	.27	.00	2.78	39.14	1.77	28.95	8.7
JUL	.27	.00	2.87	40.44	1.86	30.01	8.7
AUG	.00	.00	2.87	40.44	1.94	30.29	8.7
SEP	26.35	.00	2.78	39.14	1.71	28.73	8.7
OCT	100.74	.00	2.87	40.44	2.00	30.47	8.7
NOV	187.14	.00	2.78	39.14	1.98	29.66	8.7
DEC	367.33	.00	2.87	40.44	1.99	30.45	8.7
YEAR	1710.74	.00	33.84	476.17	23.57	359.03	8.7

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 626901. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL KITCHEN ZONE 1 NIGHT SETBACK (FT LEONARD WOOD)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS SYSTEM COOL	WHEN LOADS NOT MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1002E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.9449E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.8501E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5946E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.3835E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	-120.6
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	-9145.
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2810E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4872E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.7357E+06
DEC	856.	586.	1.000	35.	0.	0.	0	6	.0000	-.1129E+07

BLDG 630 - MESS HALL KITCHEN ZONE 1 DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 2  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 40515.000000

FLOOR AREA (SQFT) 3801.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1128650.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMA) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 76020.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 357.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.290000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 24800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 159.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 41.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1361.0	596.0	.0	610.0
WINDOW AREA SQFT (AWND)	127.0	28.0	.0	35.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	12.7	2.8	.0	3.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3801.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		2.800000E-01		
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	58.0	58.0
58.0	58.0	58.0	58.0	58.0
58.0	58.0	58.0	55.0	55.0

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
	KW	BTU/HR				
		PEOPLE	PEOPLE			
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	5.	25544.	5400.	4400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.100	.000	.000	55.0	.0
2	.100	.100	.000	.000	55.0	.0
3	.600	.400	.400	.400	55.0	.0
4	1.000	.600	.600	.600	58.0	.0
5	1.000	.800	.800	.800	58.0	.0

6	1.000	.800	1.000	1.000	58.0	.0	
7	1.000	.800	1.000	1.000	58.0	.0	
8	1.000	.800	1.000	1.000	58.0	.0	
9	1.000	.800	1.000	1.000	58.0	.0	
10	1.000	1.000	1.000	1.000	58.0	.0	
11	1.000	1.000	.800	.800	58.0	.0	
12	1.000	.800	1.000	1.000	58.0	.0	
13	1.000	.800	1.000	1.000	58.0	.0	
14	1.000	.600	.500	.500	58.0	.0	
15	1.000	.600	.500	.500	58.0	.0	
16	1.000	1.000	1.000	1.000	58.0	.0	
17	1.000	1.000	1.000	1.000	58.0	.0	
18	1.000	1.000	1.000	1.000	58.0	.0	
19	1.000	.600	1.000	1.000	58.0	.0	
20	.600	.300	.500	.500	58.0	.0	
21	.100	.100	.000	.000	55.0	.0	
22	.100	.100	.000	.000	55.0	.0	
23	.100	.100	.000	.000	55.0	.0	
24	.100	.100	.000	.000	55.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					16500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					1.000000		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1128650.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					1410813.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 630 - MESS HALL KITCHEN ZONE 1 DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-213.	LOSS		-4.	-3.	0.	-7.	-2.	-233.	0.
FEB	0.	GAIN	4.	0.	0.	0.	1.	0.	0.	0.
	-174.	LOSS		-3.	-3.	0.	-5.	-1.	-194.	0.
MAR	0.	GAIN	4.	0.	0.	0.	2.	0.	0.	0.
	-149.	LOSS		-3.	-3.	0.	-4.	-1.	-175.	0.
APR	.00	GAIN	4.34	.28	.01	.00	2.86	.01	1.02	.00
	-46.38	LOSS		-1.69	-1.56	.00	-1.85	-.78	-77.97	.00
MAY	.00	GAIN	4.70	.40	.02	.00	3.80	.01	1.39	.00
	-8.57	LOSS		-1.18	-1.07	.00	-.87	-.52	-45.36	.00
JUN	.00	GAIN	4.70	.45	.01	.00	3.83	.01	.99	.00
	.00	LOSS		-1.12	-1.06	.00	-.85	-.51	-34.74	.00
JUL	.00	GAIN	4.77	.50	.01	.00	3.86	.01	1.21	.00
	.00	LOSS		-1.19	-1.11	.00	-1.03	-.55	-36.99	.00
AUG	.00	GAIN	4.34	.43	.01	.00	3.66	.01	.97	.00
	.00	LOSS		-1.13	-.99	.00	-.79	-.48	-36.54	.00
SEP	.00	GAIN	3.90	.25	.02	.00	2.99	.01	1.69	.00
	-6.00	LOSS		-1.38	-1.14	.00	-1.10	-.57	-39.33	.00
OCT	.00	GAIN	3.60	.12	.01	.00	2.11	.00	.84	.00
	-38.31	LOSS		-1.75	-1.35	.00	-1.80	-.65	-70.28	.00
NOV	0.	GAIN	3.	0.	0.	0.	1.	0.	0.	0.
	-104.	LOSS		-2.	-2.	0.	-4.	-1.	-129.	0.
DEC	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-243.	LOSS		-4.	-4.	0.	-8.	-2.	-260.	0.
TOT	0.	GAIN	48.	3.	0.	0.	27.	0.	9.	0.
	-983.	LOSS		-26.	-23.	0.	-36.	-11.	-1332.	0.

MAX HEATING LOAD= -1128650. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F

977.8

BLDG 630 - MESS HALL KITCHEN ZONE 1 DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	58.	68.	54.	4 29	13 2	64. 9.	2.87	40.44	8.20	31.86
FEB	59.	75.	54.	17 2	18 2	44. 15.	2.60	36.53	6.69	28.06
MAR	61.	85.	54.	11 14	18 2	63. 21.	2.87	40.44	7.06	30.72
APR	66.	93.	55.	7 11	19 2	65. 33.	2.78	39.14	6.31	29.21
MAY	73.	102.	55.	27 11	19 2	76. 39.	2.87	40.44	6.67	30.33
JUN	80.	104.	59.	30 19	19 2	82. 57.	2.78	39.14	6.06	28.95
JUL	85.	114.	60.	15 10	19 4	87. 57.	2.87	40.44	6.35	30.01
AUG	83.	109.	62.	12 24	19 24	84. 59.	2.87	40.44	6.63	30.29
SEP	76.	110.	55.	2 26	19 2	83. 45.	2.78	39.14	5.83	28.73
OCT	66.	92.	55.	14 11	19 1	71. 36.	2.87	40.44	6.78	30.44
NOV	62.	83.	55.	17 2	19 24	59. 20.	2.78	39.14	6.77	29.66
DEC	59.	78.	53.	23 18	19 7	54. -1.	2.87	40.44	6.73	30.39
YEAR							33.84	476.17	80.07	358.65

BLDG 630 - MESS HALL KITCHEN ZONE 1 DDC (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	620	0	0	0	-.9680E+06	.0000
FEB	513	0	0	0	-.8981E+06	.0000
MAR	507	0	0	0	-.8060E+06	.0000
APR	228	0	0	0	-.5452E+06	.0000
MAY	81	0	0	0	-.3448E+06	.0000
JUN	0	0	0	0	.0000	.0000
JUL	0	0	0	0	.0000	.0000
AUG	0	0	0	0	.0000	.0000
SEP	81	0	0	0	-.2332E+06	.0000
OCT	256	0	0	0	-.4464E+06	.0000
NOV	377	0	0	0	-.7044E+06	.0000
DEC	554	0	6	0	-.1129E+07	.0000
YEAR	3217	0	6	0	-.1129E+07	.0000



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	333.82	.00	2.87	40.44	2.40	31.86	8.7	
FEB	273.32	.00	2.60	36.53	1.96	28.06	8.7	
MAR	243.31	.00	2.87	40.44	2.07	30.72	8.7	
APR	87.63	.00	2.78	39.14	1.85	29.21	8.7	
MAY	24.57	.00	2.87	40.44	1.95	30.33	8.7	
JUN	.00	.00	2.78	39.14	1.77	28.95	8.7	
JUL	.00	.00	2.87	40.44	1.86	30.01	8.7	
AUG	.00	.00	2.87	40.44	1.94	30.29	8.7	
SEP	22.14	.00	2.78	39.14	1.71	28.73	8.7	
OCT	85.31	.00	2.87	40.44	1.99	30.44	8.7	
NOV	174.27	.00	2.78	39.14	1.98	29.66	8.7	
DEC	351.27	.00	2.87	40.44	1.97	30.39	8.7	
YEAR	1595.64	.00	33.84	476.17	23.46	358.65	8.7	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 596518. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL KITCHEN ZONE 1 DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS SYSTEM COOL	WHEN LOADS NOT MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.9680E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.8981E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.8060E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5452E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.3448E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2332E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4464E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.7044E+06
DEC	856.	586.	1.000	35.	0.	0.	0	6	.0000	-.1129E+07

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
W

----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
NUMBER OF ZONES (NZ) 1  
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 40515.000000

FLOOR AREA (SQFT) 3801.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1128650.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 76020.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 357.000000

INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 5.290000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 24800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 159.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 41.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1361.0	596.0	.0	610.0
WINDOW AREA SQFT (AWND)	127.0	28.0	.0	35.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	12.7	2.8	.0	3.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3801.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		2.800000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
	KW	BTU/HR				
		PEOPLE	PEOPLE			
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	5.	25544.	5400.	4400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.100	.000	.000	60.0	.0
2	.100	.100	.000	.000	60.0	.0
3	.600	.400	.400	.400	60.0	.0
4	1.000	.600	.600	.600	60.0	.0
5	1.000	.800	.800	.800	60.0	.0
6	1.000	.800	1.000	1.000	60.0	.0
7	1.000	.800	1.000	1.000	60.0	.0
8	1.000	.800	1.000	1.000	60.0	.0
9	1.000	.800	1.000	1.000	60.0	.0
10	1.000	1.000	1.000	1.000	60.0	.0
11	1.000	1.000	.800	.800	60.0	.0
12	1.000	.800	1.000	1.000	60.0	.0

13	1.000	.800	1.000	1.000	60.0	.0	
14	1.000	.600	.500	.500	60.0	.0	
15	1.000	.600	.500	.500	60.0	.0	
16	1.000	1.000	1.000	1.000	60.0	.0	
17	1.000	1.000	1.000	1.000	60.0	.0	
18	1.000	1.000	1.000	1.000	60.0	.0	
19	1.000	.600	1.000	1.000	60.0	.0	
20	.600	.300	.500	.500	60.0	.0	
21	.100	.100	.000	.000	60.0	.0	
22	.100	.100	.000	.000	60.0	.0	
23	.100	.100	.000	.000	60.0	.0	
24	.100	.100	.000	.000	60.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					16500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					1.000000		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1128650.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					1410813.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
W

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-240.	LOSS		-4.	-4.	0.	-8.	-2.	-257.	0.
FEB	0.	GAIN	4.	0.	0.	0.	1.	0.	0.	0.
	-197.	LOSS		-3.	-3.	0.	-6.	-2.	-215.	0.
MAR	0.	GAIN	4.	0.	0.	0.	1.	0.	0.	0.
	-174.	LOSS		-3.	-3.	0.	-5.	-2.	-198.	0.
APR	.00	GAIN	4.34	.27	.01	.00	2.63	.01	.88	.00
	-58.76	LOSS		-1.90	-1.79	.00	-2.35	-.90	-88.96	.00
MAY	.00	GAIN	4.70	.39	.01	.00	3.61	.01	1.26	.00
	-14.36	LOSS		-1.30	-1.21	.00	-1.12	-.58	-50.24	.00
JUN	.00	GAIN	4.70	.44	.01	.00	3.76	.01	.98	.00
	-.10	LOSS		-1.18	-1.13	.00	-1.01	-.55	-34.36	.00
JUL	.00	GAIN	4.77	.49	.01	.00	3.79	.01	1.20	.00
	-.01	LOSS		-1.26	-1.19	.00	-1.22	-.59	-36.58	.00
AUG	.00	GAIN	4.34	.42	.01	.00	3.59	.01	.96	.00
	.00	LOSS		-1.19	-1.06	.00	-.94	-.52	-36.13	.00
SEP	.00	GAIN	3.90	.23	.02	.00	2.80	.01	1.49	.00
	-12.17	LOSS		-1.52	-1.30	.00	-1.41	-.64	-44.31	.00
OCT	.00	GAIN	3.60	.11	.01	.00	1.89	.00	.73	.00
	-54.13	LOSS		-1.98	-1.60	.00	-2.38	-.78	-84.46	.00
NOV	0.	GAIN	3.	0.	0.	0.	1.	0.	0.	0.
	-124.	LOSS		-3.	-2.	0.	-4.	-1.	-147.	0.
DEC	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-268.	LOSS		-4.	-4.	0.	-9.	-2.	-283.	0.
TOT	0.	GAIN	48.	2.	0.	0.	25.	0.	8.	0.
	-1142.	LOSS		-28.	-26.	0.	-43.	-13.	-1475.	0.

MAX HEATING LOAD= -1128650. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F 977.8

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
W

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	68.	59.	4 29	13 2	64. 9.	2.87	40.44	8.32	31.98
FEB	61.	77.	59.	17 2	18 2	44. 15.	2.60	36.53	6.79	28.16
MAR	64.	87.	59.	11 14	19 2	61. 21.	2.87	40.44	7.08	30.74
APR	68.	95.	60.	29 11	19 2	69. 33.	2.78	39.14	6.24	29.13
MAY	73.	104.	60.	27 11	19 2	76. 39.	2.87	40.44	6.67	30.33
JUN	81.	106.	60.	24 19	19 2	75. 57.	2.78	39.14	6.06	28.95
JUL	85.	116.	60.	15 10	19 4	87. 57.	2.87	40.44	6.35	30.01
AUG	83.	111.	62.	12 24	19 24	84. 59.	2.87	40.44	6.63	30.29
SEP	77.	111.	60.	2 26	19 2	83. 45.	2.78	39.14	5.83	28.73
OCT	68.	94.	60.	14 11	19 1	71. 36.	2.87	40.44	6.69	30.35
NOV	64.	84.	59.	17 2	19 24	59. 20.	2.78	39.14	6.85	29.75
DEC	62.	80.	54.	23 18	19 7	54. -1.	2.87	40.44	6.74	30.40
YEAR							33.84	476.17	80.25	358.83

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
W

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING	NUMBER OF HOURS WHEN		MAXIMUM LOADS	
		INCLUDING ECONOMIZER	LOADS WERE NOT MET		BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	653	0	0	0	-.1055E+07	.0000
FEB	533	0	0	0	-.9225E+06	.0000
MAR	527	0	0	0	-.8295E+06	.0000
APR	263	0	0	0	-.5626E+06	.0000
MAY	118	0	0	0	-.3923E+06	.0000
JUN	5	0	0	0	-.4361E+05	.0000
JUL	1	0	0	0	-7715.	.0000
AUG	0	0	0	0	.0000	.0000
SEP	110	0	0	0	-.2662E+06	.0000
OCT	311	0	0	0	-.4868E+06	.0000
NOV	420	0	0	0	-.7936E+06	.0000
DEC	557	0	11	0	-.1129E+07	.0000
YEAR	3498	0	11	0	-.1129E+07	.0000



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	368.76	.00	2.87	40.44	2.44	31.98	8.7
FEB	300.08	.00	2.60	36.53	1.99	28.16	8.7
MAR	273.42	.00	2.87	40.44	2.07	30.74	8.7
APR	107.50	.00	2.78	39.14	1.83	29.13	8.7
MAY	37.53	.00	2.87	40.44	1.95	30.33	8.7
JUN	1.34	.00	2.78	39.14	1.77	28.95	8.7
JUL	.27	.00	2.87	40.44	1.86	30.01	8.7
AUG	.00	.00	2.87	40.44	1.94	30.29	8.7
SEP	32.52	.00	2.78	39.14	1.71	28.73	8.7
OCT	112.60	.00	2.87	40.44	1.96	30.35	8.7
NOV	201.86	.00	2.78	39.14	2.01	29.75	8.7
DEC	379.67	.00	2.87	40.44	1.98	30.40	8.7
YEAR	1815.56	.00	33.84	476.17	23.51	358.83	8.7

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 654424. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
W

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1055E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.9225E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.8295E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5626E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.3923E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	-.4361E+05
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	-7715.
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2662E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4868E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.7936E+06
DEC	856.	586.	1.000	35.	0.	0.	0	11	.0000	-.1129E+07

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WO

----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 40515.000000

FLOOR AREA (SQFT) 3801.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1128650.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 76020.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 357.000000

INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.290000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 24800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 159.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 41.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1361.0	596.0	.0	610.0
WINDOW AREA SQFT (AWND)	127.0	28.0	.0	35.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	12.7	2.8	.0	3.5
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3801.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		2.800000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
	KW	BTU/HR				
		PEOPLE	PEOPLE			
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	5.	25544.	5400.	4400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.100	.000	.000	60.0	.0
2	.100	.100	.000	.000	60.0	.0
3	.600	.400	.400	.400	60.0	.0
4	1.000	.600	.600	.600	60.0	.0
5	1.000	.800	.800	.800	60.0	.0
6	1.000	.800	1.000	1.000	60.0	.0
7	1.000	.800	1.000	1.000	60.0	.0
8	1.000	.800	1.000	1.000	60.0	.0
9	1.000	.800	1.000	1.000	60.0	.0
10	1.000	1.000	1.000	1.000	60.0	.0
11	1.000	1.000	.800	.800	60.0	.0
12	1.000	.800	1.000	1.000	60.0	.0

13	1.000	.800	1.000	1.000	60.0	.0
14	1.000	.600	.500	.500	60.0	.0
15	1.000	.600	.500	.500	60.0	.0
16	1.000	1.000	1.000	1.000	60.0	.0
17	1.000	1.000	1.000	1.000	60.0	.0
18	1.000	1.000	1.000	1.000	60.0	.0
19	1.000	.600	1.000	1.000	60.0	.0
20	.600	.300	.500	.500	60.0	.0
21	.100	.100	.000	.000	60.0	.0
22	.100	.100	.000	.000	60.0	.0
23	.100	.100	.000	.000	60.0	.0
24	.100	.100	.000	.000	60.0	.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					16500.000000	
ECONOMIZER HIGH TEMP LIMIT F					100.000000	
SYSTEM SUPPLY AIR START TIME HR					1.000000	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1128650.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					1410813.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400
.500	.537	.600	.625	.700	.718	.800
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10	
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WO

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-242.	LOSS		-4.	-4.	0.	-8.	-2.	-259.	0.
FEB	0.	GAIN	4.	0.	0.	0.	0.	0.	0.	0.
	-199.	LOSS		-3.	-3.	0.	-6.	-2.	-217.	0.
MAR	0.	GAIN	4.	0.	0.	0.	1.	0.	0.	0.
	-176.	LOSS		-3.	-3.	0.	-5.	-2.	-200.	0.
APR	.00	GAIN	4.34	.27	.01	.00	2.65	.01	.87	.00
	-59.61	LOSS		-1.87	-1.76	.00	-2.27	-.88	-90.10	.00
MAY	.00	GAIN	4.70	.39	.02	.00	3.66	.01	1.26	.00
	-14.77	LOSS		-1.26	-1.16	.00	-1.01	-.56	-50.92	.00
JUN	.00	GAIN	4.70	.44	.01	.00	3.80	.01	.98	.00
	-.11	LOSS		-1.13	-1.08	.00	-.89	-.53	-34.70	.00
JUL	.00	GAIN	4.77	.50	.01	.00	3.83	.01	1.20	.00
	-.01	LOSS		-1.21	-1.13	.00	-1.08	-.56	-36.86	.00
AUG	.00	GAIN	4.34	.43	.01	.00	3.64	.01	.95	.00
	.00	LOSS		-1.14	-1.01	.00	-.82	-.49	-36.42	.00
SEP	.00	GAIN	3.90	.24	.02	.00	2.85	.01	1.47	.00
	-12.50	LOSS		-1.47	-1.24	.00	-1.28	-.62	-45.00	.00
OCT	.00	GAIN	3.60	.11	.01	.00	1.92	.00	.72	.00
	-54.99	LOSS		-1.95	-1.56	.00	-2.28	-.76	-85.57	.00
NOV	0.	GAIN	3.	0.	0.	0.	1.	0.	0.	0.
	-126.	LOSS		-3.	-2.	0.	-4.	-1.	-149.	0.
DEC	0.	GAIN	3.	0.	0.	0.	0.	0.	0.	0.
	-271.	LOSS		-4.	-4.	0.	-9.	-2.	-285.	0.
TOT	0.	GAIN	48.	3.	0.	0.	25.	0.	8.	0.
	-1155.	LOSS		-28.	-25.	0.	-42.	-12.	-1490.	0.

MAX HEATING LOAD= -1128650. BTUH ON DEC 18 HOUR 9 AMBIENT TEMP 3.  
MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F

977.8

## BEACON Energy Analysis By Energy Systems Engineers, Inc.

630A-5.I

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WO

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	68.	59.	4 29	13 2	64. 9.	2.87	40.44	8.28	31.94
FEB	61.	77.	59.	17 2	17 2	50. 15.	2.60	36.53	6.75	28.12
MAR	63.	87.	59.	11 14	18 2	63. 21.	2.87	40.44	7.08	30.74
APR	68.	94.	60.	29 9	19 2	69. 33.	2.78	39.14	6.37	29.27
MAY	73.	103.	60.	27 11	19 2	76. 39.	2.87	40.44	6.67	30.33
JUN	80.	105.	60.	24 19	19 2	75. 57.	2.78	39.14	6.06	28.95
JUL	85.	115.	60.	15 10	19 5	87. 57.	2.87	40.44	6.35	30.01
AUG	83.	110.	62.	12 24	19 24	84. 59.	2.87	40.44	6.63	30.29
SEP	77.	110.	60.	2 26	18 2	86. 45.	2.78	39.14	5.83	28.73
OCT	67.	92.	60.	14 11	19 1	71. 36.	2.87	40.44	6.79	30.45
NOV	64.	84.	59.	17 2	19 24	59. 20.	2.78	39.14	6.84	29.74
DEC	61.	79.	53.	23 18	19 7	54. -1.	2.87	40.44	6.81	30.47
YEAR							33.84	476.17	80.47	359.04

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WO

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED			NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER		HEATING	COOLING	HEATING	COOLING
JAN	650	0		0	0	-.1077E+07	.0000
FEB	530	0		0	0	-.9416E+06	.0000
MAR	528	0		0	0	-.8468E+06	.0000
APR	275	0		0	0	-.5748E+06	.0000
MAY	118	0		0	0	-.4008E+06	.0000
JUN	6	0		0	0	-.4773E+05	.0000
JUL	1	0		0	0	-9153.	.0000
AUG	0	0		0	0	.0000	.0000
SEP	110	0		0	0	-.2719E+06	.0000
OCT	319	0		0	0	-.4969E+06	.0000
NOV	420	0		0	0	-.8096E+06	.0000
DEC	563	0		12	0	-.1129E+07	.0000
YEAR	3520	0		12	0	-.1129E+07	.0000



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL	INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	370.50	.00	2.87	40.44	2.43	31.94	8.7	
FEB	302.47	.00	2.60	36.53	1.98	28.12	8.7	
MAR	274.98	.00	2.87	40.44	2.07	30.74	8.7	
APR	110.04	.00	2.78	39.14	1.87	29.27	8.7	
MAY	38.07	.00	2.87	40.44	1.95	30.33	8.7	
JUN	1.61	.00	2.78	39.14	1.77	28.95	8.7	
JUL	.27	.00	2.87	40.44	1.86	30.01	8.7	
AUG	.00	.00	2.87	40.44	1.94	30.29	8.7	
SEP	32.79	.00	2.78	39.14	1.71	28.73	8.7	
OCT	115.28	.00	2.87	40.44	1.99	30.45	8.7	
NOV	205.00	.00	2.78	39.14	2.00	29.74	8.7	
DEC	382.13	.00	2.87	40.44	2.00	30.47	8.7	
YEAR	1833.15	.00	33.84	476.17	23.58	359.04	8.7	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 659108. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL KITCHEN AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WO

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET	COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1077E+07	
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.9416E+06	
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.8468E+06	
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5748E+06	
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.4008E+06	
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	-.4773E+05	
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	-9153.	
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000	
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2719E+06	
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4969E+06	
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.8096E+06	
DEC	856.	586.	1.000	35.	0.	0.	0	12	.0000	-.1129E+07	

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 63022  
BLDG. TYPE: MESS HALL (DINING)

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	753.1	507.0	465.4	465.4	656.6	709.7
COOLING (KWH)	37410	29430	27730	26400	37190	36580

SUPPLY AIR FAN	14000 CFM
FLOOR AREA	7190 FT <sup>2</sup>
CFMI	700 CFM
UA	2642 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	500	1900	70 HR	HR. ON HEATING	2548 HR/YR
SAT.	500	1900	14 HR	HR. ON COOLING	1708 HR/YR
SUN.	500	1900	14 HR	HR. OFF HEATING	1820 HR/YR
	TOTAL OCCUPY HR.		98 HR/WK	HR. OFF COOLING	1220 HR/YR
	TOTAL UNOCC. HR.		70 HR/WK		
	ANNUAL OCCUPY HR.		5110 HR/YR		
	ANNUAL UNOCC. HR.		3650 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 2548 = 1820 HR/YR  
 HOUR SAVE (COOLING ONLY) 2928 - 1708 = 1220 HR/YR

HOAUHC	753.1 MBtu -	656.6 MBtu	=	3.78E+01 Btu/CFM-HR
	700 CFM *	3650 HR/YR		
HOAUH	753.1 MBtu -	656.6 MBtu	=	7.57E+01 Btu/CFM-HR
	700 CFM *	1820 HR/YR		
COAUHC	37410 KWH -	37190 KWH	=	8.61E-05 KWH/CFM-HR
	700 CFM *	3650 HR/YR		
COAUH	37410 KWH -	37190 KWH	=	2.58E-04 KWH/CFM-HR
	700 CFM *	1220 HR/YR		
HOAOHC	753.1 MBtu -	709.7 MBtu	=	1.21E+01 Btu/CFM-HR
	700 CFM *	5110 HR/YR		
HOAOH	753.1 MBtu -	709.7 MBtu	=	2.43E+01 Btu/CFM-HR
	700 CFM *	2548 HR/YR		
COAOHC	37410 KWH -	36580 KWH	=	2.32E-04 KWH/CFM-HR
	700 CFM *	5110 HR/YR		
COAOH	37410 KWH -	36580 KWH	=	6.94E-04 KWH/CFM-HR
	700 CFM *	1708 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 63022  
BLDG. TYPE: MESS HALL (DINING)

**ENERGY CONSTANT CALCULATIONS**

ECC	27730 KWH -	26400 KWH	=	5.56E-05 KWH/CFM-HR
	14000 CFM *	1708 HR/YR		
ECHC	27730 KWH -	26400 KWH	=	1.86E-05 KWH/CFM-HR
	14000 CFM *	5110 HR/YR		
NSUCHC	37410 KWH -	29430 KWH	=	1.56E-04 KWH/CFM-HR
	14000 CFM *	3650 HR/YR		
NSUCC	37410 KWH -	29430 KWH	=	4.67E-04 KWH/CFM-HR
	14000 CFM *	1220 HR/YR		
DDCCHC	29430 KWH -	27730 KWH	=	2.38E-05 KWH/CFM-HR
	14000 CFM *	5110 HR/YR		
DDCCC	29430 KWH -	27730 KWH	=	7.11E-05 KWH/CFM-HR
	14000 CFM *	1708 HR/YR		
NSC	753.1 MBtu -	507.03 MBtu	=	9.31E+04 Btu/UA
		2642 UA		
DSC	507.03 MBtu -	465.43 MBtu	=	1.57E+04 Btu/UA
		2642 UA		
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 63022BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 630 BLDG NAME: MESS HALL - ZONE 2

BLDG FUNCTION: DINING AREA

FLOOR AREA: (SQ. FT) 7,190

# FLOORS 1

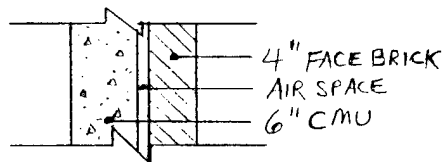
SLAB PERIMETER: (FT) 257

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,530	0	1,678	1,678	4,886
GLASS	(SQ. FT)	84	0	128	144	356
PERSONNEL DOOR	(SQ. FT)	0	0	63	63	126
INSULATED PANEL	(SQ. FT)	0	0	400	400	800
WALLS, NET	(SQ. FT)	1,446	0	1,087	1,071	3,604
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					7,190
INSULATED PANEL	(SQ. FT)	800				
PERSONNEL DOOR	(SQ. FT)					126
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

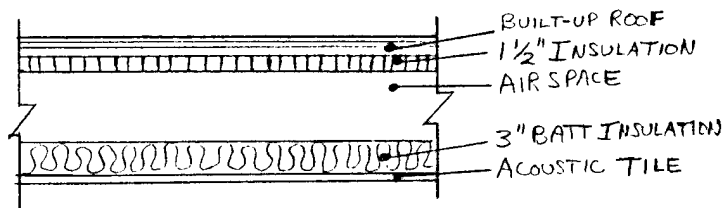
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 1.5" INSULATION	4.98
4. CEILING AIR SPACE	1.00
5. 3" INSULATION	11.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	19.95
U=1/R	0.050

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	4886	X CFM / SQ.FT.	0.115	= 562
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	100		X CFM / OPENING / HR	1.385	= 139
TOTAL INFILTRATION (CFM)				=	700

UA PANEL	= PANEL AREA	800	X PANEL 'U'	0.238	=	190
UA PDOOR	= PDOOR AREA	126	X DOOR 'U'	0.391	=	49
UA WALL	= WALL AREA	3,604	X WALL 'U'	0.245	=	883
UA ROOF	= ROOF AREA	7,190	X ROOF 'U'	0.050	=	360
UA GLASS	= GLASS AREA	356	X GLASS 'U'	0.621	=	221
UA SLAB	= SLAB PERIM.	257	X SLF	0.830	=	213
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	700	X A. T. F.	1.035	=	725

**TOTAL UA (BTU/HR°F) 2,642**

**EMC NO.:**

03-Feb-93

**PREPARED BY:**

**CHECKED BY:**

**63072**

**ZONE: 2**

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat. (BTU/H)	TOT. Sen. (BTU/H)
2	240	3	Seated Eating	Restaurant	225	325	54,000	78,000
	10	5	Standing, light work, or walking slowly	Retail store, bank	270	220	2,700	2,200
TOTAL	250					TOTAL	56,700	80,200

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
2	32	18	Incandescent - 60w	60	1,920
	68	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	5,712
TOTAL	100			TOTAL	7,632

## Peak Value for Internal Gains

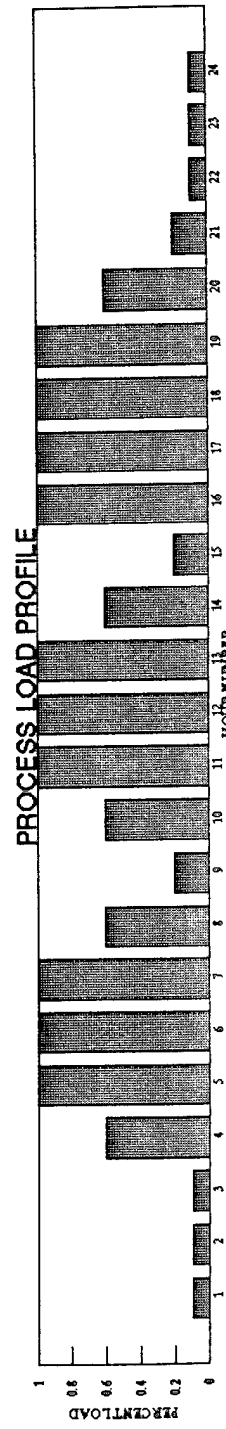
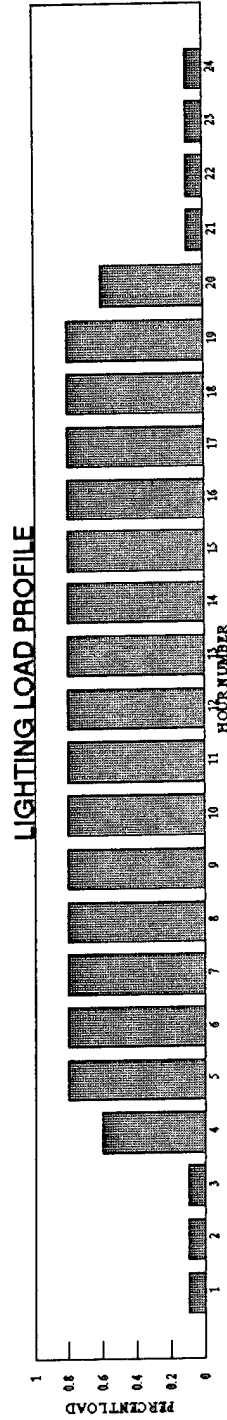
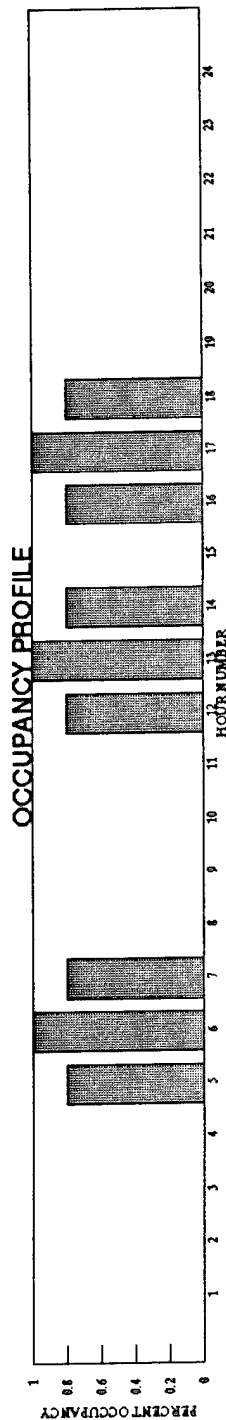
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# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 03-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 63022  
 BLDG: 630  
 ZONE: 2

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	Mess Hall	OCCUPANCY					0.8	1	0.8					0.8	1	0.8		0.8	1	0.8						
		LIGHTING	0.1	0.1	0.1	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.6	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.6	1	1	1	0.6	0.2	0.6	1	1	1	0.6	0.2	1	1	1	1	0.6	0.2	0.1	0.1	0.1



BLDG 630 - MESS HALL DINING AREA - ZONE 2 BASERUN (FT LEONARD WOOD, MO)

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----- PROGRAM CONTROL OPTIONS -----
COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1
SKY CLEARNESS FACTOR (CLN) 9.700000E-01
NUMBER OF ZONES (NZ) 1
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0
----- SITE AND BUILDING DATA -----

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\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

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FILE NAME MO
STATION 13995 YEAR 1955
SITE LATITUDE DEG (AL1) 37.750000
ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000
MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000
AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000
SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01
SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01
SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01
INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000
INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000
INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03
INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00
VOLUME OF ZONE IN CUBIC FEET (VOLHS) 76646.000000
FLOOR AREA (SQFT) 7190.000000
HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 936800.000000
COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -836640.000000
COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 71900.000000
CONSTANT INFILTRATION RATE CFM (CFMI) 700.000000
INFILTRATION PROFILE
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
A FACTOR IN INFILTRATION EQUATION (CINA) 5.480000E-01
B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02
C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03
BUILDING THERMAL MASS MCP BTU/F (CMCP) 39779.000000
BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00
SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 213.000000
PARTITION UA BTU/HR-F (GUA) 0.000000E+00
DOOR UA BTU/HR-F (DUA) 49.000000
WINDOW GLASS NUMBER (NG) 30
DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01
NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01
WINDOW SHADING FACTOR (SHD) 5.900000E-01

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WALL NUMBER	WALL DATA			
	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	1471.0	1446.0	1487.0
WINDOW AREA SQFT (AWND)	.0	144.0	84.0	128.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	14.4	8.4	12.8
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.245	.243
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01837	.01822
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00283	.00280
N=3	.01017	.01008	.01017	.01008
N=4	.00498	.00494	.00498	.00494
N=5	.00037	.00036	.00037	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7190.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		8.100000E-01		

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL HOUR	KW	BTU/HR		PEOPLE		HEATING	COOLING
	LIGHTS	PROCESS	SENSIBLE	LATENT	PEOPLE		
	8.	85858.	56700.	80200.			
	HOURLY FRACTION OF PEAK						
1	.100	.100	.000	.000		70.0	75.0
2	.100	.100	.000	.000		70.0	75.0
3	.100	.100	.000	.000		70.0	75.0
4	.600	.600	.000	.000		70.0	75.0
5	.800	1.000	.800	.800		70.0	75.0
6	.800	1.000	1.000	1.000		70.0	75.0
7	.800	1.000	.800	.800		70.0	75.0
8	.800	.600	.000	.000		70.0	75.0
9	.800	.200	.000	.000		70.0	75.0
10	.800	.600	.000	.000		70.0	75.0
11	.800	1.000	.800	.800		70.0	75.0
12	.800	1.000	1.000	1.000		70.0	75.0

13	.800	1.000	.800	.800	70.0	75.0
14	.800	.600	.000	.000	70.0	75.0
15	.800	.200	.000	.000	70.0	75.0
16	.800	1.000	.800	.800	70.0	75.0
17	.800	1.000	1.000	1.000	70.0	75.0
18	.800	1.000	.800	.800	70.0	75.0
19	.800	1.000	.000	.000	70.0	75.0
20	.600	.600	.000	.000	70.0	75.0
21	.100	.200	.000	.000	70.0	75.0
22	.100	.100	.000	.000	70.0	75.0
23	.100	.100	.000	.000	70.0	75.0
24	.100	.100	.000	.000	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					14000.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					60.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.500000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					936800.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					1171000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					836640.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					154670.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 630 - MESS HALL DINING AREA - ZONE 2      BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -79.	GAIN LOSS	5.	0. -11.	0. -7.	0. 0.	0. -24.	0. -5.	0. -111.	0. 0.
FEB	.20 -59.99	GAIN LOSS	6.30	.00 -8.88	.00 -5.98	.00 .00	.01 -18.13	.00 -4.29	.00 -95.82	.08 .00
MAR	6.72 -45.15	GAIN LOSS	7.96	.09 -8.08	.00 -5.59	.00 .00	.65 -14.47	.00 -4.00	.01 -90.47	1.34 .00
APR	32.40 -14.61	GAIN LOSS	8.53	.52 -4.98	.04 -3.36	.00 .00	2.87 -7.11	.03 -2.41	.54 -55.10	6.70 .00
MAY	67.71 -2.38	GAIN LOSS	9.31	1.14 -3.19	.14 -1.93	.00 .00	6.01 -2.78	.10 -1.34	1.71 -37.12	19.20 .00
JUN	138. 0.	GAIN LOSS	9.	2. -2.	0. -1.	0. 0.	9. -1.	0. -1.	5. -14.	58. 0.
JUL	173. 0.	GAIN LOSS	10.	3. -1.	1. 0.	0. 0.	13. 0.	1. 0.	12. -9.	73. 0.
AUG	166. 0.	GAIN LOSS	9.	2. -1.	1. -1.	0. 0.	10. 0.	0. 0.	9. -9.	73. 0.
SEP	105. -3.	GAIN LOSS	7.	1. -3.	0. -2.	0. 0.	5. -3.	0. -1.	5. -26.	45. 0.
OCT	31.87 -12.41	GAIN LOSS	5.80	.25 -5.30	.05 -3.23	.00 .00	1.19 -8.34	.04 -2.26	.69 -53.59	10.06 .00
NOV	9.56 -33.30	GAIN LOSS	4.41	.02 -7.30	.00 -4.62	.00 .00	.15 -14.65	.00 -3.24	.01 -73.11	2.86 .00
DEC	0. -75.	GAIN LOSS	4.	0. -11.	0. -7.	0. 0.	0. -24.	0. -5.	0. -106.	0. 0.
TOT	731. -325.	GAIN LOSS	86.	10. -66.	3. -42.	0. 0.	49. -118.	2. -30.	32. -681.	290. 0.

MAX HEATING LOAD= -402660. BTUH ON DEC 18 HOUR 2      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 521827. BTUH ON JUL 28 HOUR 17      AMBIENT TEMP 92.

ZONE UA BTU/HR-F      1702.3

BEACON Energy Analysis By Energy Systems Engineers, Inc.

630B.I

BLDG 630 - MESS HALL DINING AREA - ZONE 2 BASERUN (FT LEONARD WOOD, MO)

										FAN	TOTAL
INTERNAL	INTERNAL SPACE				COIN-		LIGHTING	PROCESS		HEAT	HEAT GAIN
	TEMPERATURE F				CIDENT		THOUSAND	MILLION		MILLION	MILLION
MONTH	AVG.	MAX	MIN	DAY	HR	AMBT.	KWH	BTU		BTU	BTU
JAN	71.	76.	69.	4	13	64.	3.29	46.66		11.38	74.11
				29	3	10.					
FEB	71.	76.	69.	9	13	57.	2.97	42.14		10.28	66.94
				2	3	15.					
MAR	72.	77.	69.	12	13	74.	3.29	46.66		11.38	74.11
				4	3	17.					
APR	74.	77.	69.	30	17	83.	3.18	45.16		11.01	71.72
				9	3	32.					
MAY	75.	77.	70.	28	13	85.	3.29	46.66		11.38	74.11
				11	3	38.					
JUN	76.	77.	71.	27	13	88.	3.18	45.16		11.01	71.72
				17	3	55.					
JUL	76.	77.	72.	15	13	93.	3.29	46.66		11.38	74.11
				10	3	59.					
AUG	76.	77.	71.	10	13	85.	3.29	46.66		11.38	74.11
				25	3	54.					
SEP	75.	77.	70.	3	13	89.	3.18	45.16		11.01	71.72
				15	3	41.					
OCT	74.	77.	70.	4	13	83.	3.29	46.66		11.38	74.11
				28	3	32.					
NOV	72.	77.	69.	8	13	77.	3.18	45.16		11.01	71.72
				3	3	18.					
DEC	71.	76.	69.	23	17	62.	3.29	46.66		11.38	74.11
				18	3	2.					
YEAR							38.72	549.39		134.00	872.58

BLDG 630 - MESS HALL DINING AREA - ZONE 2      BASERUN (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED						
MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	601	44	0	0	-.3593E+06	.0000
FEB	476	62	0	0	-.3171E+06	.2008E+06
MAR	421	140	0	0	-.2851E+06	.2992E+06
APR	185	291	0	0	-.1853E+06	.3280E+06
MAY	38	494	0	0	-.1332E+06	.3838E+06
JUN	0	597	0	0	.0000	.4758E+06
JUL	0	688	0	0	.0000	.5218E+06
AUG	0	688	0	0	.0000	.4746E+06
SEP	58	516	0	0	-.1166E+06	.4867E+06
OCT	189	323	0	0	-.1728E+06	.3787E+06
NOV	353	174	0	0	-.2679E+06	.2897E+06
DEC	559	33	0	0	-.4027E+06	.1194E+06
YEAR	2880	4050	0	0	-.4027E+06	.5218E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	170.52	.00	3.29	46.66	3.33	74.11	10.6
FEB	132.96	.01	2.97	42.14	3.01	66.94	23.0
MAR	110.92	.49	3.29	46.66	3.33	74.11	26.2
APR	44.69	2.18	3.18	45.16	3.23	71.72	27.1
MAY	8.68	4.19	3.29	46.66	3.33	74.11	29.5
JUN	.00	7.89	3.18	45.16	3.23	71.72	34.1
JUL	.00	9.73	3.29	46.66	3.33	74.11	36.6
AUG	.00	9.44	3.29	46.66	3.33	74.11	34.0
SEP	13.00	6.16	3.18	45.16	3.23	71.72	34.7
OCT	43.74	2.15	3.29	46.66	3.33	74.11	29.3
NOV	89.92	.71	3.18	45.16	3.23	71.72	25.9
DEC	160.31	.04	3.29	46.66	3.33	74.11	20.6
YEAR	774.74	42.98	38.72	549.39	39.26	872.58	36.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 241580. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL DINING AREA - ZONE 2 BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS SYSTEM NOT MET COOL	WHEN LOADS HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.3593E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.2008E+06	-.3171E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2992E+06	-.2851E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3280E+06	-.1853E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.3838E+06	-.1332E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.4758E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.5218E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.4746E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.4867E+06	-.1166E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.3787E+06	-.1728E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2897E+06	-.2679E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1194E+06	-.4027E+06

BLDG 630 - MESS HALL DINING AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 76646.000000

FLOOR AREA (SQFT) 7190.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 936800.000000

COOLING COIL MAX HEATING RATE BTU/HR (QCMAX) -836640.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 71900.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 700.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.480000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 39779.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 213.000000

PARTITION UA FACTOR BTU/HR-F (GUA) 0.000000E+00

DOOR UA FACTOR BTU/HR-F (DUA) 49.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	1471.0	1446.0	1487.0
WINDOW AREA SQFT (AWND)	.0	144.0	84.0	128.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	14.4	8.4	12.8
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0



	KW	- - - - -	BTU/HR	- - - - -		
			PEOPLE		PEOPLE	
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	85858.	56700.	80200.		

HOUR	HOURLY FRACTION OF PEAK						
1	.100	.100	.000	.000	55.0	90.0	
2	.100	.100	.000	.000	55.0	90.0	
3	.100	.100	.000	.000	55.0	90.0	
4	.600	.600	.000	.000	55.0	90.0	
5	.800	1.000	.800	.800	55.0	90.0	
6	.800	1.000	1.000	1.000	70.0	75.0	
7	.800	1.000	.800	.800	70.0	75.0	
8	.800	.600	.000	.000	70.0	75.0	
9	.800	.200	.000	.000	70.0	75.0	
10	.800	.600	.000	.000	70.0	75.0	
11	.800	1.000	.800	.800	70.0	75.0	
12	.800	1.000	1.000	1.000	70.0	75.0	
13	.800	1.000	.800	.800	70.0	75.0	
14	.800	.600	.000	.000	70.0	75.0	
15	.800	.200	.000	.000	70.0	75.0	
16	.800	1.000	.800	.800	70.0	75.0	
17	.800	1.000	1.000	1.000	70.0	75.0	
18	.800	1.000	.800	.800	70.0	75.0	
19	.800	1.000	.000	.000	70.0	75.0	
20	.600	.600	.000	.000	55.0	90.0	
21	.100	.200	.000	.000	55.0	90.0	
22	.100	.100	.000	.000	55.0	90.0	
23	.100	.100	.000	.000	55.0	90.0	
24	.100	.100	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					14000.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					60.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.500000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					936800.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					1171000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400 .451	
.500	.537	.600	.625	.700	.718	.800 .812	
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					836640.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					154670.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400 .370	
.500	.450	.600	.550	.700	.650	.800 .760	
.900	.880	1.00	1.00				

BLDG 630 - MESS HALL DINING AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	4.73	.00	.00	.00	.00	.00	.00	.00
	-56.40	LOSS		-9.43	-6.09	.00	-20.20	-4.36	-95.48	.00
FEB	.20	GAIN	6.30	.00	.00	.00	.01	.00	.00	.08
	-42.51	LOSS		-7.88	-5.25	.00	-15.15	-3.77	-83.60	.00
MAR	6.48	GAIN	7.96	.09	.00	.00	.69	.00	.01	1.26
	-30.00	LOSS		-7.23	-4.96	.00	-11.99	-3.56	-80.11	.00
APR	30.75	GAIN	8.53	.52	.04	.00	2.84	.03	.54	6.28
	-7.81	LOSS		-4.64	-3.11	.00	-6.04	-2.24	-50.67	.00
MAY	63.29	GAIN	9.31	1.14	.14	.00	5.76	.10	1.71	17.75
	-.57	LOSS		-3.32	-2.03	.00	-2.90	-1.40	-37.56	.00
JUN	121.	GAIN	9.	2.	0.	0.	9.	0.	5.	47.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-17.	0.
JUL	141.	GAIN	10.	3.	1.	0.	11.	1.	11.	51.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-15.	0.
AUG	134.	GAIN	9.	2.	1.	0.	9.	0.	8.	50.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-15.	0.
SEP	89.05	GAIN	7.04	1.08	.35	.00	4.89	.25	4.55	33.82
	-.61	LOSS		-3.00	-1.65	.00	-2.75	-1.16	-27.17	.00
OCT	30.00	GAIN	5.80	.25	.05	.00	1.16	.04	.69	9.24
	-5.79	LOSS		-4.99	-3.00	.00	-7.38	-2.10	-49.73	.00
NOV	9.25	GAIN	4.41	.02	.00	.00	.16	.00	.01	2.71
	-20.50	LOSS		-6.59	-4.10	.00	-12.56	-2.87	-64.54	.00
DEC	.36	GAIN	4.04	.00	.00	.00	.00	.00	.00	.00
	-54.01	LOSS		-9.38	-5.98	.00	-20.58	-4.23	-91.49	.00
TOT	625.	GAIN	86.	10.	3.	0.	44.	2.	32.	219.
	-218.	LOSS		-63.	-39.	0.	-102.	-28.	-627.	0.

MAX HEATING LOAD= -544704. BTUH ON DEC 18 HOUR 6 AMBIENT TEMP 0.  
 MAX COOLING LOAD= 632203. BTUH ON JUL 16 HOUR 6 AMBIENT TEMP 74.

ZONE UA BTU/HR-F 1702.3

BLDG 630 - MESS HALL DINING AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	66.	76.	54.	4 29	13 3	64. 10.	3.29	46.66	11.38	74.11
FEB	67.	77.	54.	9 2	20 3	63. 15.	2.97	42.14	10.28	66.94
MAR	69.	78.	54.	24 4	21 3	69. 17.	3.29	46.66	11.38	74.11
APR	72.	81.	55.	27 1	5 3	68. 37.	3.18	45.16	11.01	71.72
MAY	76.	81.	58.	30 11	5 4	65. 38.	3.29	46.66	11.38	74.11
JUN	78.	86.	72.	30 17	5 3	72. 55.	3.18	45.16	11.01	71.72
JUL	79.	90.	74.	16 10	5 3	74. 59.	3.29	46.66	11.38	74.11
AUG	78.	89.	72.	1 25	5 3	74. 54.	3.29	46.66	11.38	74.11
SEP	76.	87.	61.	3 15	5 4	74. 41.	3.18	45.16	11.01	71.72
OCT	73.	82.	55.	5 11	5 4	67. 39.	3.29	46.66	11.38	74.11
NOV	70.	78.	54.	8 3	5 3	66. 18.	3.18	45.16	11.01	71.72
DEC	66.	76.	54.	23 18	17 3	62. 2.	3.29	46.66	11.38	74.11
YEAR							38.72	549.39	134.00	872.58

BLDG 630 - MESS HALL DINING AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING	NUMBER OF HOURS WHEN		MAXIMUM LOADS	
		INCLUDING	LOADS WERE NOT MET		BTU	
		ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	452	42	0	0	-.5242E+06	.0000
FEB	337	63	0	0	-.4535E+06	.2028E+06
MAR	273	132	0	0	-.4525E+06	.3006E+06
APR	82	252	0	0	-.3463E+06	.3472E+06
MAY	8	401	0	0	-.2142E+06	.3832E+06
JUN	0	420	0	0	.0000	.5472E+06
JUL	0	435	0	0	.0000	.6322E+06
AUG	0	434	0	0	.0000	.6201E+06
SEP	13	368	0	0	-.1623E+06	.5824E+06
OCT	75	278	0	0	-.3246E+06	.3778E+06
NOV	203	156	0	0	-.4193E+06	.2893E+06
DEC	421	32	0	0	-.5447E+06	.1208E+06
YEAR	1864	3013	0	0	-.5447E+06	.6322E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	126.38	.00	3.29	46.66	3.33	74.11	10.6
FEB	94.96	.01	2.97	42.14	3.01	66.94	23.1
MAR	73.31	.47	3.29	46.66	3.33	74.11	26.2
APR	21.30	1.96	3.18	45.16	3.23	71.72	27.9
MAY	2.00	3.75	3.29	46.66	3.33	74.11	29.5
JUN	.00	6.45	3.18	45.16	3.23	71.72	38.0
JUL	.00	7.36	3.29	46.66	3.33	74.11	42.8
AUG	.00	7.01	3.29	46.66	3.33	74.11	42.1
SEP	3.01	4.86	3.18	45.16	3.23	71.72	39.9
OCT	18.50	1.92	3.29	46.66	3.33	74.11	29.2
NOV	53.21	.66	3.18	45.16	3.23	71.72	25.9
DEC	119.36	.04	3.29	46.66	3.33	74.11	20.7
YEAR	512.04	34.49	38.72	549.39	39.26	872.58	42.8

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 201015. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL DINING AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX TEMP.	SYSTEM DRIFT	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	BTU/ SQFT- DAY	BTU/ SQFT- DAY		DEG. F	DEG. F	COOL	HEAT	BTU	BTU	
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.5242E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.2028E+06	-.4535E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.3006E+06	-.4525E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3472E+06	-.3463E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.3832E+06	-.2142E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.5472E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.6322E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.6201E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.5824E+06	-.1623E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.3778E+06	-.3246E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2893E+06	-.4193E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1208E+06	-.5447E+06

BLDG 630 - MESS HALL DINING AREA - ZONE 2 DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 76646.000000  
 FLOOR AREA (SQFT) 7190.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 936800.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -836640.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 71900.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 700.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.480000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 39779.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 213.000000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 49.000000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	1471.0	1446.0	1487.0
WINDOW AREA SQFT (AWND)	.0	144.0	84.0	128.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	14.4	8.4	12.8
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.245	.243
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01837	.01822
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00283	.00280
N=3	.01017	.01008	.01017	.01008
N=4	.00498	.00494	.00498	.00494
N=5	.00037	.00036	.00037	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7190.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1	1	
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1	1	
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	8.100000E-01			
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0	78.0	78.0	78.0	
78.0 78.0 78.0 78.0 78.0	78.0	78.0	78.0	
78.0 78.0 78.0 90.0 90.0	90.0	90.0	90.0	
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0	68.0	68.0	68.0	
68.0 68.0 68.0 68.0 68.0	68.0	68.0	68.0	
68.0 68.0 68.0 55.0 55.0	55.0	55.0	55.0	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	BTU/HR				PEOPLE		THERMOSTAT SET	
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING	POINT DEG F	

PEAK VAL	8.	85858.	56700.	80200.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.100	.000	.000	55.0	90.0	
2	.100	.100	.000	.000	55.0	90.0	
3	.100	.100	.000	.000	55.0	90.0	
4	.600	.600	.000	.000	55.0	90.0	
5	.800	1.000	.800	.800	55.0	90.0	
6	.800	1.000	1.000	1.000	68.0	78.0	
7	.800	1.000	.800	.800	68.0	78.0	
8	.800	.600	.000	.000	68.0	78.0	
9	.800	.200	.000	.000	68.0	78.0	
10	.800	.600	.000	.000	68.0	78.0	
11	.800	1.000	.800	.800	68.0	78.0	
12	.800	1.000	1.000	1.000	68.0	78.0	
13	.800	1.000	.800	.800	68.0	78.0	
14	.800	.600	.000	.000	68.0	78.0	
15	.800	.200	.000	.000	68.0	78.0	
16	.800	1.000	.800	.800	68.0	78.0	
17	.800	1.000	1.000	1.000	68.0	78.0	
18	.800	1.000	.800	.800	68.0	78.0	
19	.800	1.000	.000	.000	68.0	78.0	
20	.600	.600	.000	.000	55.0	90.0	
21	.100	.200	.000	.000	55.0	90.0	
22	.100	.100	.000	.000	55.0	90.0	
23	.100	.100	.000	.000	55.0	90.0	
24	.100	.100	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					14000.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					60.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.500000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					936800.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					1171000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					836640.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					154670.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400	.370
.500	.450	.600	.550	.700	.650	.800	.760
.900	.880	1.00	1.00				

BLDG 630 - MESS HALL DINING AREA - ZONE 2 DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

			SOLAR	PARTITN				VENT		
MNTH	LOAD		THRU	DOOR	SLAB	BSMT	WALL	WINDOW	AND	LATENT
			WINDOW	AND					INFL	
JAN	.00	GAIN	4.73	.00	.00	.00	.00	.00	.00	.00
	-51.34	LOSS		-9.22	-5.94	.00	-19.55	-4.25	-91.51	.00
FEB	.18	GAIN	6.30	.00	.00	.00	.00	.00	.00	.08
	-38.14	LOSS		-7.76	-5.16	.00	-14.78	-3.70	-79.89	.00
MAR	5.55	GAIN	7.96	.06	.00	.00	.53	.00	.00	1.24
	-25.93	LOSS		-7.20	-4.97	.00	-11.85	-3.56	-76.95	.00
APR	27.58	GAIN	8.53	.40	.02	.00	2.30	.01	.21	6.28
	-6.13	LOSS		-4.82	-3.30	.00	-6.36	-2.38	-50.23	.00
MAY	58.21	GAIN	9.31	.92	.06	.00	4.75	.04	.67	17.40
	-.31	LOSS		-3.66	-2.35	.00	-3.57	-1.63	-38.02	.00
JUN	112.	GAIN	9.	2.	0.	0.	7.	0.	3.	46.
	0.	LOSS		-3.	-1.	0.	-2.	-1.	-20.	0.
JUL	131.	GAIN	10.	2.	1.	0.	10.	0.	8.	49.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-17.	0.
AUG	125.	GAIN	9.	2.	0.	0.	8.	0.	5.	49.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-17.	0.
SEP	81.85	GAIN	7.04	.86	.22	.00	3.97	.16	2.89	33.42
	-.20	LOSS		-3.31	-1.90	.00	-3.40	-1.35	-29.19	.00
OCT	26.19	GAIN	5.80	.18	.02	.00	.83	.02	.30	8.68
	-3.90	LOSS		-5.27	-3.23	.00	-8.10	-2.26	-48.85	.00
NOV	7.66	GAIN	4.41	.01	.00	.00	.08	.00	.00	2.64
	-17.47	LOSS		-6.66	-4.16	.00	-12.75	-2.92	-62.61	.00
DEC	.19	GAIN	4.04	.00	.00	.00	.00	.00	.00	.00
	-48.97	LOSS		-9.15	-5.82	.00	-19.92	-4.11	-87.80	.00
TOT	575.	GAIN	86.	8.	2.	0.	37.	1.	20.	214.
	-192.	LOSS		-64.	-41.	0.	-105.	-29.	-618.	0.

MAX HEATING LOAD= -493744. BTUH ON DEC 18 HOUR 6 AMBIENT TEMP 0.  
 MAX COOLING LOAD= 561619. BTUH ON JUL 16 HOUR 6 AMBIENT TEMP 74.

ZONE UA BTU/HR-F 1702.3

BLDG 630 - MESS HALL DINING AREA - ZONE 2 DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	65.	79.	54.	4 29	13 3	64. 10.	3.29	46.66	11.38	74.11
FEB	67.	79.	54.	13 2	17 3	64. 15.	2.97	42.14	10.28	66.94
MAR	69.	80.	54.	24 4	20 3	69. 17.	3.29	46.66	11.38	74.11
APR	74.	82.	55.	30 1	21 3	71. 37.	3.18	45.16	11.01	71.72
MAY	78.	83.	59.	31 11	22 4	73. 38.	3.29	46.66	11.38	74.11
JUN	80.	87.	73.	30 17	5 3	72. 55.	3.18	45.16	11.01	71.72
JUL	81.	91.	74.	16 10	5 3	74. 59.	3.29	46.66	11.38	74.11
AUG	81.	89.	73.	1 25	5 3	74. 54.	3.29	46.66	11.38	74.11
SEP	78.	88.	61.	3 15	5 4	74. 41.	3.18	45.16	11.01	71.72
OCT	74.	82.	55.	5 11	5 4	67. 39.	3.29	46.66	11.38	74.11
NOV	70.	80.	54.	8 3	20 3	67. 18.	3.18	45.16	11.01	71.72
DEC	65.	79.	54.	23 18	17 3	62. 2.	3.29	46.66	11.38	74.11
YEAR							38.72	549.39	134.00	872.58

BLDG 630 - MESS HALL DINING AREA - ZONE 2 DDC (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	439	21	0	0	-.4733E+06	.0000
FEB	325	30	0	0	-.4025E+06	.1752E+06
MAR	256	88	0	0	-.4015E+06	.2857E+06
APR	71	202	0	0	-.2955E+06	.3120E+06
MAY	5	375	0	0	-.1528E+06	.3670E+06
JUN	0	417	0	0	.0000	.4842E+06
JUL	0	435	0	0	.0000	.5616E+06
AUG	0	429	0	0	.0000	.5574E+06
SEP	6	354	0	0	-.1001E+06	.5185E+06
OCT	60	224	0	0	-.2732E+06	.3616E+06
NOV	189	114	0	0	-.3683E+06	.2736E+06
DEC	396	18	0	0	-.4937E+06	.1034E+06
YEAR	1747	2707	0	0	-.4937E+06	.5616E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	119.47	.00	3.29	46.66	3.33	74.11	10.6
FEB	88.99	.01	2.97	42.14	3.01	66.94	22.2
MAR	66.89	.42	3.29	46.66	3.33	74.11	25.8
APR	17.80	1.83	3.18	45.16	3.23	71.72	26.6
MAY	1.19	3.56	3.29	46.66	3.33	74.11	28.8
JUN	.00	6.10	3.18	45.16	3.23	71.72	34.5
JUL	.00	6.91	3.29	46.66	3.33	74.11	38.7
AUG	.00	6.64	3.29	46.66	3.33	74.11	38.5
SEP	1.35	4.52	3.18	45.16	3.23	71.72	36.4
OCT	14.31	1.75	3.29	46.66	3.33	74.11	28.5
NOV	48.00	.60	3.18	45.16	3.23	71.72	25.4
DEC	109.98	.04	3.29	46.66	3.33	74.11	20.2
YEAR	467.97	32.40	38.72	549.39	39.26	872.58	38.7

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 193893. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL DINING AREA - ZONE 2 DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.4733E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.1752E+06	-.4025E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2857E+06	-.4015E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3120E+06	-.2955E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.3670E+06	-.1528E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.4842E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.5616E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.5574E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.5185E+06	-.1001E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.3616E+06	-.2732E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2736E+06	-.3683E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1034E+06	-.4937E+06

BLDG 630 - MESS HALL DINING AREA - ZONE 2 ECONOMIZER (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 76646.000000

FLOOR AREA (SQFT) 7190.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 936800.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -836640.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 71900.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 700.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.480000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 39779.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 213.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 49.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	1471.0	1446.0	1487.0
WINDOW AREA SQFT (AWND)	.0	144.0	84.0	128.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	14.4	8.4	12.8
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.245	.243
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01837	.01822
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00283	.00280
N=3	.01017	.01008	.01017	.01008
N=4	.00498	.00494	.00498	.00494
N=5	.00037	.00036	.00037	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7190.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		8.100000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0	78.0	78.0	78.0	
78.0 78.0 78.0 78.0 78.0	78.0	78.0	78.0	
78.0 78.0 78.0 90.0 90.0	90.0	90.0	90.0	
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0	68.0	68.0	68.0	
68.0 68.0 68.0 68.0 68.0	68.0	68.0	68.0	
68.0 68.0 68.0 55.0 55.0	55.0	55.0	55.0	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	-----	BTU/HR	-----		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	8.	85858.	56700.	80200.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.100	.000	.000	55.0	90.0	
2	.100	.100	.000	.000	55.0	90.0	
3	.100	.100	.000	.000	55.0	90.0	
4	.600	.600	.000	.000	55.0	90.0	
5	.800	1.000	.800	.800	55.0	90.0	
6	.800	1.000	1.000	1.000	68.0	78.0	
7	.800	1.000	.800	.800	68.0	78.0	
8	.800	.600	.000	.000	68.0	78.0	
9	.800	.200	.000	.000	68.0	78.0	
10	.800	.600	.000	.000	68.0	78.0	
11	.800	1.000	.800	.800	68.0	78.0	
12	.800	1.000	1.000	1.000	68.0	78.0	
13	.800	1.000	.800	.800	68.0	78.0	
14	.800	.600	.000	.000	68.0	78.0	
15	.800	.200	.000	.000	68.0	78.0	
16	.800	1.000	.800	.800	68.0	78.0	
17	.800	1.000	1.000	1.000	68.0	78.0	
18	.800	1.000	.800	.800	68.0	78.0	
19	.800	1.000	.000	.000	68.0	78.0	
20	.600	.600	.000	.000	55.0	90.0	
21	.100	.200	.000	.000	55.0	90.0	
22	.100	.100	.000	.000	55.0	90.0	
23	.100	.100	.000	.000	55.0	90.0	
24	.100	.100	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					14000.000000		
ECONOMIZER HIGH TEMP LIMIT F					72.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR FRACTION (TMXAIR)					60.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.500000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					936800.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					1171000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					836640.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					154670.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400	.370
.500	.450	.600	.550	.700	.650	.800	.760
.900	.880	1.00	1.00				

BLDG 630 - MESS HALL DINING AREA - ZONE 2 ECONOMIZER (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	4.73	.00	.00	.00	.00	.00	.00	.00
	-51.34	LOSS		-9.22	-5.94	.00	-19.55	-4.25	-91.51	.00
FEB	.00	GAIN	6.30	.00	.00	.00	.00	.00	.00	.00
	-38.14	LOSS		-7.76	-5.16	.00	-14.78	-3.70	-79.99	.00
MAR	3.04	GAIN	7.96	.06	.00	.00	.53	.00	.00	.90
	-25.93	LOSS		-7.20	-4.97	.00	-11.85	-3.56	-79.12	.00
APR	20.69	GAIN	8.53	.40	.02	.00	2.30	.01	.21	6.42
	-6.13	LOSS		-4.82	-3.30	.00	-6.36	-2.38	-57.26	.00
MAY	51.24	GAIN	9.31	.92	.06	.00	4.75	.04	.67	17.89
	-.31	LOSS		-3.66	-2.35	.00	-3.57	-1.63	-45.49	.00
JUN	109.	GAIN	9.	2.	0.	0.	7.	0.	3.	54.
	0.	LOSS		-3.	-1.	0.	-2.	-1.	-31.	0.
JUL	130.	GAIN	10.	2.	1.	0.	10.	0.	8.	55.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-23.	0.
AUG	125.	GAIN	9.	2.	0.	0.	8.	0.	5.	57.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-25.	0.
SEP	78.15	GAIN	7.04	.86	.22	.00	3.97	.16	2.89	38.77
	-.20	LOSS		-3.31	-1.90	.00	-3.40	-1.35	-38.24	.00
OCT	19.31	GAIN	5.80	.18	.02	.00	.83	.02	.30	8.91
	-3.90	LOSS		-5.27	-3.23	.00	-8.10	-2.26	-55.96	.00
NOV	3.13	GAIN	4.41	.01	.00	.00	.08	.00	.00	1.56
	-17.47	LOSS		-6.66	-4.16	.00	-12.75	-2.92	-66.06	.00
DEC	.00	GAIN	4.04	.00	.00	.00	.00	.00	.00	.00
	-48.97	LOSS		-9.15	-5.82	.00	-19.92	-4.11	-87.99	.00
TOT	540.	GAIN	86.	8.	2.	0.	37.	1.	20.	241.
	-192.	LOSS		-64.	-41.	0.	-105.	-29.	-681.	0.

MAX HEATING LOAD= -493744. BTUH ON DEC 18 HOUR 6 AMBIENT TEMP 0.  
 MAX COOLING LOAD= 689215. BTUH ON JUL 6 HOUR 7 AMBIENT TEMP 72.

ZONE UA BTU/HR-F 1702.3

BLDG 630 - MESS HALL DINING AREA - ZONE 2 ECONOMIZER (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	65.	79.	54.	4 29	13 3	64. 10.	3.29	46.66	11.38	74.11
FEB	67.	79.	54.	13 2	17 3	64. 15.	2.97	42.14	10.28	66.94
MAR	69.	80.	54.	24 4	20 3	69. 17.	3.29	46.66	11.38	74.11
APR	74.	82.	55.	30 1	21 3	71. 37.	3.18	45.16	11.01	71.72
MAY	78.	83.	59.	31 11	22 4	73. 38.	3.29	46.66	11.38	74.11
JUN	80.	87.	73.	30 17	5 3	72. 55.	3.18	45.16	11.01	71.72
JUL	81.	91.	74.	16 10	5 3	74. 59.	3.29	46.66	11.38	74.11
AUG	81.	89.	73.	1 25	5 3	74. 54.	3.29	46.66	11.38	74.11
SEP	78.	88.	61.	3 15	5 4	74. 41.	3.18	45.16	11.01	71.72
OCT	74.	82.	55.	5 11	5 4	67. 39.	3.29	46.66	11.38	74.11
NOV	70.	80.	54.	8 3	20 3	67. 18.	3.18	45.16	11.01	71.72
DEC	65.	79.	54.	23 18	17 3	62. 2.	3.29	46.66	11.38	74.11
YEAR							38.72	549.39	134.00	872.58

BLDG 630 - MESS HALL DINING AREA - ZONE 2 ECONOMIZER (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	439	21	0	0	-.4733E+06	.0000
FEB	325	30	0	0	-.4025E+06	.0000
MAR	256	88	0	0	-.4015E+06	.2898E+06
APR	71	202	0	0	-.2955E+06	.3120E+06
MAY	5	375	0	0	-.1528E+06	.3670E+06
JUN	0	417	0	0	.0000	.6245E+06
JUL	0	435	0	0	.0000	.6892E+06
AUG	0	429	0	0	.0000	.6616E+06
SEP	6	354	0	0	-.1001E+06	.5959E+06
OCT	60	224	0	0	-.2732E+06	.4696E+06
NOV	189	114	0	0	-.3683E+06	.2736E+06
DEC	396	18	0	0	-.4937E+06	.0000
YEAR	1747	2707	0	0	-.4937E+06	.6892E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	119.47	.00	3.29	46.66	3.33	74.11	10.6
FEB	88.99	.00	2.97	42.14	3.01	66.94	10.6
MAR	66.89	.23	3.29	46.66	3.33	74.11	25.9
APR	17.80	1.40	3.18	45.16	3.23	71.72	26.6
MAY	1.19	3.01	3.29	46.66	3.33	74.11	28.8
JUN	.00	5.76	3.18	45.16	3.23	71.72	42.4
JUL	.00	6.80	3.29	46.66	3.33	74.11	46.3
AUG	.00	6.60	3.29	46.66	3.33	74.11	44.6
SEP	1.35	4.23	3.18	45.16	3.23	71.72	40.7
OCT	14.31	1.18	3.29	46.66	3.33	74.11	33.8
NOV	48.00	.23	3.18	45.16	3.23	71.72	25.4
DEC	109.98	.00	3.29	46.66	3.33	74.11	10.6
YEAR	467.97	29.44	38.72	549.39	39.26	872.58	46.3

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR      192490. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL DINING AREA - ZONE 2 ECONOMIZER (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS SYSTEM NOT MET COOL	WHEN LOADS MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.4733E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.4025E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2898E+06	-.4015E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3120E+06	-.2955E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.3670E+06	-.1528E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.6245E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.6892E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.6616E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.5959E+06	-.1001E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.4696E+06	-.2732E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2736E+06	-.3683E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.4937E+06

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
NUMBER OF ZONES (NZ) 1  
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 76646.000000

FLOOR AREA (SQFT) 7190.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 936800.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -836640.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 71900.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 700.000000

INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 5.480000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 39779.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 213.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 49.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	1471.0	1446.0	1487.0
WINDOW AREA SQFT (AWND)	.0	144.0	84.0	128.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	14.4	8.4	12.8
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.245	.243
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01837	.01822
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00283	.00280
N=3	.01017	.01008	.01017	.01008
N=4	.00498	.00494	.00498	.00494
N=5	.00037	.00036	.00037	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7190.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	8.100000E-01			

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
	KW	BTU/HR				
		PEOPLE	PEOPLE			
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	85858.	56700.	80200.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.100	.000	.000	70.0	75.0
2	.100	.100	.000	.000	70.0	75.0
3	.100	.100	.000	.000	70.0	75.0
4	.600	.600	.000	.000	70.0	75.0
5	.800	1.000	.800	.800	70.0	75.0
6	.800	1.000	1.000	1.000	70.0	75.0
7	.800	1.000	.800	.800	70.0	75.0
8	.800	.600	.000	.000	70.0	75.0
9	.800	.200	.000	.000	70.0	75.0
10	.800	.600	.000	.000	70.0	75.0
11	.800	1.000	.800	.800	70.0	75.0
12	.800	1.000	1.000	1.000	70.0	75.0

13	.800	1.000	.800	.800	70.0	75.0
14	.800	.600	.000	.000	70.0	75.0
15	.800	.200	.000	.000	70.0	75.0
16	.800	1.000	.800	.800	70.0	75.0
17	.800	1.000	1.000	1.000	70.0	75.0
18	.800	1.000	.800	.800	70.0	75.0
19	.800	1.000	.000	.000	70.0	75.0
20	.600	.600	.000	.000	70.0	75.0
21	.100	.200	.000	.000	70.0	75.0
22	.100	.100	.000	.000	70.0	75.0
23	.100	.100	.000	.000	70.0	75.0
24	.100	.100	.000	.000	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					14000.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					60.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.500000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					936800.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					1171000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					836640.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					154670.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	4.73	.00	.00	.00	.00	.00	.00	.00
	-65.71	LOSS		-10.71	-7.02	.00	-23.98	-5.02	-97.83	.00
FEB	.20	GAIN	6.30	.00	.00	.00	.00	.00	.00	.08
	-49.46	LOSS		-8.92	-6.00	.00	-18.23	-4.31	-85.12	.00
MAR	6.96	GAIN	7.96	.09	.00	.00	.64	.00	.01	1.49
	-36.02	LOSS		-8.13	-5.62	.00	-14.60	-4.02	-81.00	.00
APR	32.72	GAIN	8.53	.52	.04	.00	2.84	.03	.51	6.72
	-10.51	LOSS		-5.03	-3.40	.00	-7.26	-2.44	-50.37	.00
MAY	67.68	GAIN	9.31	1.14	.14	.00	5.97	.10	1.63	18.83
	-1.51	LOSS		-3.25	-1.98	.00	-2.92	-1.37	-35.54	.00
JUN	136.	GAIN	9.	2.	0.	0.	9.	0.	5.	55.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-13.	0.
JUL	167.	GAIN	10.	3.	1.	0.	13.	1.	11.	66.
	0.	LOSS		-1.	-1.	0.	0.	0.	-8.	0.
AUG	159.	GAIN	9.	2.	1.	0.	10.	0.	8.	66.
	0.	LOSS		-1.	-1.	0.	0.	0.	-8.	0.
SEP	102.	GAIN	7.	1.	0.	0.	5.	0.	4.	42.
	-2.	LOSS		-3.	-2.	0.	-3.	-1.	-24.	0.
OCT	32.13	GAIN	5.80	.25	.05	.00	1.18	.04	.68	9.86
	-8.65	LOSS		-5.36	-3.28	.00	-8.51	-2.29	-49.05	.00
NOV	9.65	GAIN	4.41	.02	.00	.00	.15	.00	.01	2.82
	-25.94	LOSS		-7.35	-4.66	.00	-14.80	-3.26	-65.37	.00
DEC	.35	GAIN	4.04	.00	.00	.00	.00	.00	.00	.00
	-62.67	LOSS		-10.66	-6.91	.00	-24.40	-4.89	-93.61	.00
TOT	714.	GAIN	86.	10.	3.	0.	49.	2.	31.	269.
	-262.	LOSS		-67.	-42.	0.	-119.	-30.	-611.	0.

MAX HEATING LOAD= -347498. BTUH ON DEC 18 HOUR 2 AMBIENT TEMP 3.  
MAX COOLING LOAD= 486741. BTUH ON SEP 2 HOUR 12 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 1702.3

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	71.	76.	69.	4 29	13 3	64. 10.	3.29	46.66	11.38	74.11
FEB	71.	76.	69.	9 2	13 3	57. 15.	2.97	42.14	10.28	66.94
MAR	72.	77.	69.	12 4	13 3	74. 17.	3.29	46.66	11.38	74.11
APR	74.	77.	69.	30 1	17 3	83. 37.	3.18	45.16	11.01	71.72
MAY	75.	77.	70.	28 9	13 3	85. 44.	3.29	46.66	11.38	74.11
JUN	76.	77.	72.	27 17	13 3	88. 55.	3.18	45.16	11.01	71.72
JUL	76.	77.	73.	15 10	13 3	93. 59.	3.29	46.66	11.38	74.11
AUG	76.	77.	72.	10 25	13 3	85. 54.	3.29	46.66	11.38	74.11
SEP	75.	77.	70.	3 15	13 3	89. 41.	3.18	45.16	11.01	71.72
OCT	74.	77.	70.	4 28	13 3	83. 32.	3.29	46.66	11.38	74.11
NOV	73.	77.	69.	8 3	13 3	77. 18.	3.18	45.16	11.01	71.72
DEC	71.	76.	69.	23 18	17 3	62. 2.	3.29	46.66	11.38	74.11
YEAR							38.72	549.39	134.00	872.58

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	573	50	0	0	-.3080E+06	.0000
FEB	448	69	0	0	-.2730E+06	.2006E+06
MAR	379	148	0	0	-.2572E+06	.2911E+06
APR	154	320	0	0	-.1561E+06	.3203E+06
MAY	28	513	0	0	-.1086E+06	.3654E+06
JUN	0	629	0	0	.0000	.4641E+06
JUL	0	702	0	0	.0000	.4838E+06
AUG	0	699	0	0	.0000	.4615E+06
SEP	45	542	0	0	-.9443E+05	.4867E+06
OCT	148	342	0	0	-.1434E+06	.3787E+06
NOV	307	180	0	0	-.2264E+06	.2896E+06
DEC	525	39	0	0	-.3475E+06	.1192E+06
YEAR	2607	4233	0	0	-.3475E+06	.4867E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	154.48	.00	3.29	46.66	3.33	74.11	10.6
FEB	118.60	.01	2.97	42.14	3.01	66.94	23.0
MAR	95.82	.52	3.29	46.66	3.33	74.11	25.9
APR	35.91	2.22	3.18	45.16	3.23	71.72	26.9
MAY	6.27	4.22	3.29	46.66	3.33	74.11	28.7
JUN	.00	7.97	3.18	45.16	3.23	71.72	33.5
JUL	.00	9.58	3.29	46.66	3.33	74.11	34.5
AUG	.00	9.27	3.29	46.66	3.33	74.11	33.3
SEP	10.04	6.15	3.18	45.16	3.23	71.72	34.7
OCT	33.52	2.20	3.29	46.66	3.33	74.11	29.3
NOV	75.27	.71	3.18	45.16	3.23	71.72	25.9
DEC	143.02	.04	3.29	46.66	3.33	74.11	20.6
YEAR	672.94	42.88	38.72	549.39	39.26	872.58	34.7

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 227376. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX TEMP.	SYSTEM DRIFT	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	HORIZ. SURF. BTU/ SQFT-	HORIZ. SURF. BTU/ SQFT-		DEG. F	DEG. F	COOL	HEAT	BTU	BTU	
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.3080E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.2006E+06	-.2730E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2911E+06	-.2572E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3203E+06	-.1561E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.3654E+06	-.1086E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.4641E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.4838E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.4615E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.4867E+06	-.9443E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.3787E+06	-.1434E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2896E+06	-.2264E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1192E+06	-.3475E+06

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 76646.000000

FLOOR AREA (SQFT) 7190.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 936800.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -836640.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 71900.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 700.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 5.480000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 39779.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 213.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 49.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	1471.0	1446.0	1487.0
WINDOW AREA SQFT (AWND)	.0	144.0	84.0	128.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	14.4	8.4	12.8
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0



U VALUE BTU/(HR-SQFT-F) (UW)	.245	.243	.245	.243
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01822	.01837	.01822
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00280	.00283	.00280
N=3	.01017	.01008	.01017	.01008
N=4	.00498	.00494	.00498	.00494
N=5	.00037	.00036	.00037	.00036
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7190.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	5.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.423913E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.136E-02 .140E-01 .848E-02 .380E-03	543.	543.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1	1	
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1	1	
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	8.100000E-01			

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
					HEATING	COOLING
PEAK VAL	KW	BTU/HR	PEOPLE	PEOPLE		
	LIGHTS	PROCESS	SENSIBLE	LATENT		
8.	85858.	56700.	80200.			
HOURLY FRACTION OF PEAK						
1	.100	.100	.000	.000	70.0	75.0
2	.100	.100	.000	.000	70.0	75.0
3	.100	.100	.000	.000	70.0	75.0
4	.600	.600	.000	.000	70.0	75.0
5	.800	1.000	.800	.800	70.0	75.0
6	.800	1.000	1.000	1.000	70.0	75.0
7	.800	1.000	.800	.800	70.0	75.0
8	.800	.600	.000	.000	70.0	75.0
9	.800	.200	.000	.000	70.0	75.0
10	.800	.600	.000	.000	70.0	75.0
11	.800	1.000	.800	.800	70.0	75.0
12	.800	1.000	1.000	1.000	70.0	75.0
13	.800	1.000	.800	.800	70.0	75.0

14	.800	.600	.000	.000	70.0	75.0
15	.800	.200	.000	.000	70.0	75.0
16	.800	1.000	.800	.800	70.0	75.0
17	.800	1.000	1.000	1.000	70.0	75.0
18	.800	1.000	.800	.800	70.0	75.0
19	.800	1.000	.000	.000	70.0	75.0
20	.600	.600	.000	.000	70.0	75.0
21	.100	.200	.000	.000	70.0	75.0
22	.100	.100	.000	.000	70.0	75.0
23	.100	.100	.000	.000	70.0	75.0
24	.100	.100	.000	.000	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					14000.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					60.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.500000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					936800.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					1171000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400
.500	.537	.600	.625	.700	.718	.800
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					836640.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					154670.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400
.500	.450	.600	.550	.700	.650	.800
.900	.880	1.00	1.00			

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	5.	0.	0.	0.	0.	0.	0.	0.
	-72.	LOSS		-11.	-7.	0.	-24.	-5.	-105.	0.
FEB	.20	GAIN	6.30	.00	.00	.00	.00	.00	.00	.07
	-55.29	LOSS		-8.92	-6.01	.00	-18.23	-4.31	-90.94	.00
MAR	6.99	GAIN	7.96	.09	.00	.00	.64	.00	.01	1.47
	-41.68	LOSS		-8.12	-5.61	.00	-14.58	-4.02	-86.65	.00
APR	32.46	GAIN	8.53	.52	.04	.00	2.86	.03	.45	6.57
	-13.99	LOSS		-5.01	-3.38	.00	-7.20	-2.42	-54.04	.00
MAY	66.54	GAIN	9.31	1.14	.14	.00	6.01	.10	1.41	18.05
	-2.38	LOSS		-3.19	-1.94	.00	-2.79	-1.34	-36.82	.00
JUN	133.	GAIN	9.	2.	0.	0.	9.	0.	4.	53.
	0.	LOSS		-2.	-1.	0.	-1.	-1.	-14.	0.
JUL	167.	GAIN	10.	3.	1.	0.	13.	1.	10.	69.
	0.	LOSS		-1.	0.	0.	0.	0.	-9.	0.
AUG	160.	GAIN	9.	2.	1.	0.	10.	0.	7.	68.
	0.	LOSS		-1.	-1.	0.	0.	0.	-9.	0.
SEP	101.	GAIN	7.	1.	0.	0.	5.	0.	4.	42.
	-3.	LOSS		-3.	-2.	0.	-3.	-1.	-26.	0.
OCT	31.45	GAIN	5.80	.25	.05	.00	1.19	.04	.55	9.43
	-11.91	LOSS		-5.33	-3.25	.00	-8.40	-2.27	-52.64	.00
NOV	9.67	GAIN	4.41	.02	.00	.00	.15	.00	.01	2.76
	-30.89	LOSS		-7.34	-4.65	.00	-14.77	-3.26	-70.29	.00
DEC	0.	GAIN	4.	0.	0.	0.	0.	0.	0.	0.
	-70.	LOSS		-11.	-7.	0.	-24.	-5.	-101.	0.
TOT	709.	GAIN	86.	10.	3.	0.	49.	2.	27.	270.
	-301.	LOSS		-67.	-42.	0.	-119.	-30.	-654.	0.

MAX HEATING LOAD= -402674. BTUH ON DEC 18 HOUR 2 AMBIENT TEMP 3.  
 MAX COOLING LOAD= 521701. BTUH ON JUL 28 HOUR 17 AMBIENT TEMP 92.

ZONE UA BTU/HR-F 1702.3

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	71.	76.	69.	4 29	13 3	64. 10.	3.29	46.66	11.38	74.11
FEB	71.	76.	69.	9 2	13 3	57. 15.	2.97	42.14	10.28	66.94
MAR	72.	77.	69.	12 4	13 3	74. 17.	3.29	46.66	11.38	74.11
APR	74.	77.	69.	30 9	17 3	83. 32.	3.18	45.16	11.01	71.72
MAY	75.	77.	70.	29 11	18 3	84. 38.	3.29	46.66	11.38	74.11
JUN	76.	77.	71.	27 17	13 3	88. 55.	3.18	45.16	11.01	71.72
JUL	76.	77.	72.	15 10	13 3	93. 59.	3.29	46.66	11.38	74.11
AUG	76.	77.	71.	10 25	13 3	85. 54.	3.29	46.66	11.38	74.11
SEP	75.	77.	70.	3 15	13 3	89. 41.	3.18	45.16	11.01	71.72
OCT	74.	77.	70.	4 28	13 3	83. 32.	3.29	46.66	11.38	74.11
NOV	72.	77.	69.	8 3	13 3	77. 18.	3.18	45.16	11.01	71.72
DEC	71.	76.	69.	29 18	13 3	63. 2.	3.29	46.66	11.38	74.11
YEAR							38.72	549.39	134.00	872.58

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WOO

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	570	51	0	0	-.3596E+06	.0000
FEB	451	74	0	0	-.3171E+06	.2013E+06
MAR	401	158	0	0	-.2851E+06	.2992E+06
APR	179	312	0	0	-.1857E+06	.3279E+06
MAY	38	498	0	0	-.1332E+06	.3837E+06
JUN	0	597	0	0	.0000	.4758E+06
JUL	0	688	0	0	.0000	.5217E+06
AUG	0	688	0	0	.0000	.4745E+06
SEP	58	518	0	0	-.1167E+06	.4714E+06
OCT	181	341	0	0	-.1729E+06	.3597E+06
NOV	330	189	0	0	-.2679E+06	.2822E+06
DEC	529	41	0	0	-.4027E+06	.1373E+06
YEAR	2737	4155	0	0	-.4027E+06	.5217E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	160.20	.00	3.29	46.66	3.33	74.11	10.6
FEB	124.91	.01	2.97	42.14	3.01	66.94	23.0
MAR	105.05	.51	3.29	46.66	3.33	74.11	26.2
APR	43.30	2.18	3.18	45.16	3.23	71.72	27.1
MAY	8.68	4.16	3.29	46.66	3.33	74.11	29.5
JUN	.00	7.68	3.18	45.16	3.23	71.72	34.1
JUL	.00	9.50	3.29	46.66	3.33	74.11	36.6
AUG	.00	9.21	3.29	46.66	3.33	74.11	34.0
SEP	13.00	6.03	3.18	45.16	3.23	71.72	33.9
OCT	41.95	2.13	3.29	46.66	3.33	74.11	28.4
NOV	83.99	.71	3.18	45.16	3.23	71.72	25.7
DEC	150.25	.04	3.29	46.66	3.33	74.11	21.1
YEAR	731.34	42.16	38.72	549.39	39.26	872.58	36.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 235155. BTU/(SQFT-YEAR)

BLDG 630 - MESS HALL DINING AREA - ZONE 2 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WOO

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.3596E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.2013E+06	-.3171E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2992E+06	-.2851E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3279E+06	-.1857E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.3837E+06	-.1332E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.4758E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.5217E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.4745E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.4714E+06	-.1167E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.3597E+06	-.1729E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2822E+06	-.2679E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1373E+06	-.4027E+06

**COMPUTER SIMULATIONS**

**BUILDING 637**



**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 637Z1  
BLDG. TYPE: CHURCH (CHAPEL AREA)

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1129.8	620.3	615.6	615.6	1065.6	1099.4
COOLING (kWH)	32780	13650	13320	12610	31380	31240

SUPPLY AIR FAN	6970 CFM
FLOOR AREA	4647 FT <sup>2</sup>
CFM1	604 CFM
UA	3143 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	1900	2000	5 HR	HR. ON HEATING	286 HR/YR
SAT.	1100	1200	1 HR	HR. ON COOLING	192 HR/YR
SUN.	700	1200	5 HR	HR. OFF HEATING	4082 HR/YR
	TOTAL OCCUPY HR.		11 HR/WK	HR. OFF COOLING	2736 HR/YR
	TOTAL UNOCC. HR.		157 HR/WK		
	ANNUAL OCCUPY HR.		574 HR/YR		
	ANNUAL UNOCC. HR.		8186 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 286 = 4082 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 192 = 2736 HR/YR

HOAUHC	1129.8 MBtu	-	1065.6 MBtu	=	1.30E+01 Btu/CFM-HR
	604 CFM *		8186 HR/YR		
HOAUH	1129.8 MBtu	-	1065.6 MBtu	=	2.60E+01 Btu/CFM-HR
	604 CFM *		4082 HR/YR		
COAUHC	32780 kWH	-	31380 kWH	=	2.83E-04 kWH/CFM-HR
	604 CFM *		8186 HR/YR		
COAUC	32780 kWH	-	31380 kWH	=	8.47E-04 kWH/CFM-HR
	604 CFM *		2736 HR/YR		
HOAOHC	1129.8 MBtu	-	1099.4 MBtu	=	8.78E+01 Btu/CFM-HR
	604 CFM *		574 HR/YR		
HOAOH	1129.8 MBtu	-	1099.4 MBtu	=	1.76E+02 Btu/CFM-HR
	604 CFM *		286 HR/YR		
COAOHC	32780 kWH	-	31240 kWH	=	4.45E-03 kWH/CFM-HR
	604 CFM *		574 HR/YR		
COAOC	32780 kWH	-	31240 kWH	=	1.33E-02 kWH/CFM-HR
	604 CFM *		192 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 637Z1  
BLDG. TYPE: CHURCH (CHAPEL AREA)

**ENERGY CONSTANT CALCULATIONS**

ECC	13320 KWH -	12610 KWH	=	5.31E-04 KWH/CFM-HR
	6970 CFM *	192 HR/YR		
ECHO	13320 KWH -	12610 KWH	=	1.78E-04 KWH/CFM-HR
	6970 CFM *	574 HR/YR		
NSUCHO	32780 KWH -	13650 KWH	=	3.35E-04 KWH/CFM-HR
	6970 CFM *	8186 HR/YR		
NSUCC	32780 KWH -	13650 KWH	=	1.00E-03 KWH/CFM-HR
	6970 CFM *	2736 HR/YR		
DDCCHO	13650 KWH -	13320 KWH	=	8.25E-05 KWH/CFM-HR
	6970 CFM *	574 HR/YR		
DDCCO	13650 KWH -	13320 KWH	=	2.47E-04 KWH/CFM-HR
	6970 CFM *	192 HR/YR		
NSC	1129.8 MBtu -	620.25 MBtu	=	1.62E+05 Btu/UA
		3143 UA		
DSC	620.25 MBtu -	615.64 MBtu	=	1.47E+03 Btu/UA
		3143 UA		
OPT	( 2 HR/DAY X 272 DAY/YR ) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 10-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 637Z1 BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 637 BLDG NAME: CHAPEL - ZONE 1

BLDG FUNCTION: CHAPEL AREA

FLOOR AREA: (SQ. FT)

4,647

# FLOORS 1

SLAB PERIMETER: (FT)

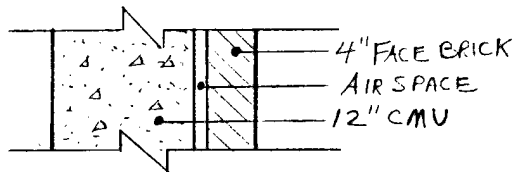
300

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,822	2,369	1,458	1,458	7,107
GLASS	(SQ. FT)	253	486	94	0	833
PERSONNEL DOOR	(SQ. FT)	21	21	41	0	82
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	1,548	1,862	1,323	1,458	6,192
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 5,313
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)	82	
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

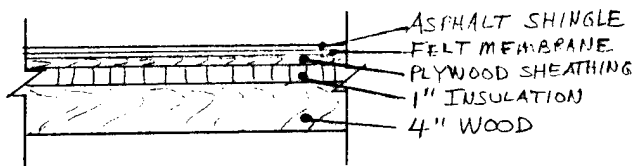
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 12" CMU	3.03
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.22
U=1/R	0.191

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. ASPHALT SHINGLE	0.20
3. .375" FELT MEMBRANE	0.29
4. PLYWOOD SHEATHING	0.47
5. 1" INSULATION	3.33
6. 4" WOOD	4.76
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	9.90
U=1/R	0.101

GLASS TYPE: PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.

R-GLASS 1.61

SLAB TYPE FLOOR: CEMENT

SLF 0.67

BASEMENT TYPE: NONE

R-BASEM. 0.00

OVERHEAD DOOR TYPE: NONE

R-ODOOR 0.00

PERSONNEL DOOR TYPE: 2' RED OAK WITH 80% SINGLE GLASS

R-PDOOR 1.06

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)	H	7107	X CFM / SQ.FT.	0.083	=	590
AVG. WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING /HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	10		X CFM / OPENING /HR	1.385	=	14
TOTAL INFILTRATION (CFM)					=	604

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	82	X DOOR 'U'	0.943	=	78
UA WALL	= WALL AREA	6,192	X WALL 'U'	0.191	=	1,185
UA ROOF	= ROOF AREA	5,313	X ROOF 'U'	0.101	=	537
UA GLASS	= GLASS AREA	833	X GLASS 'U'	0.621	=	517
UA SLAB	= SLAB PERIM.	300	X SLF	0.670	=	201
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	604	X A. T. F.	1.035	=	625

**TOTAL UA (BTU/HR°F)****3,143**

EMC NO.: 3204-000  
DATE: 05-Feb-93  
PREPARED BY: BHS  
CHECKED BY: CEL  
FILE: 637Z1  
BLDG: 637

[illegible]

<b>Peak Wattage Value for Lights</b>					
<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>No. of Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
1	10		Incandescent – 750w	750	7,500
	4		Incandescent – 200w	200	800
	6	21	Incandescent – 150w	150	900
	7	18	Incandescent – 60w	60	420
<b>TOTAL</b>	<b>27</b>			<b>TOTAL</b>	<b>9,620</b>

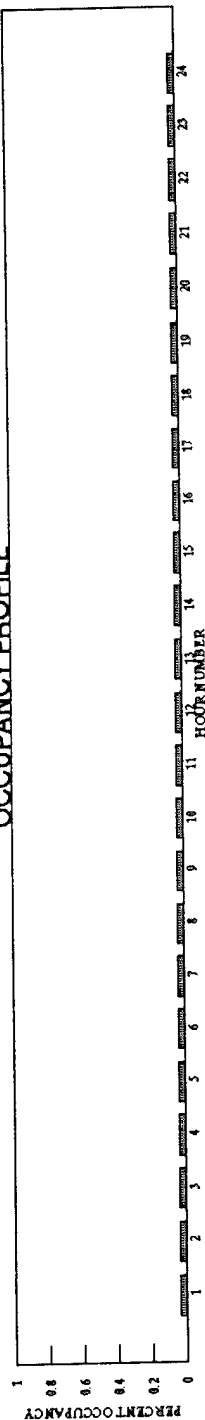
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EMC NO.: 3204-000  
 DATE: 05-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 637Z1  
 BLDG: 637  
 ZONE: 1

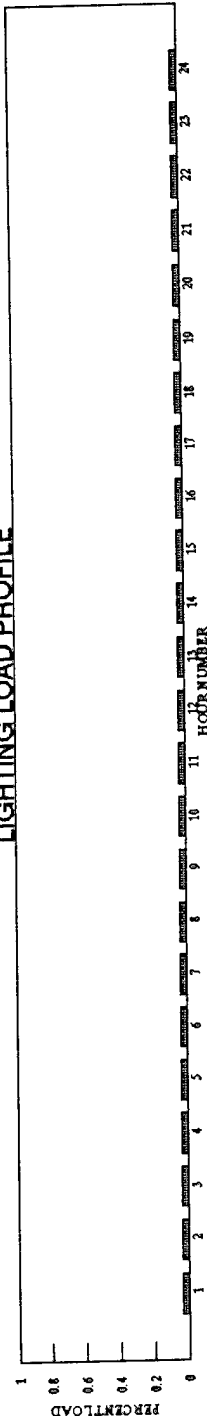
**E M C Engineers, Inc.**  
 PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
8	Church	OCCUPANCY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		LIGHTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		PROCESS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

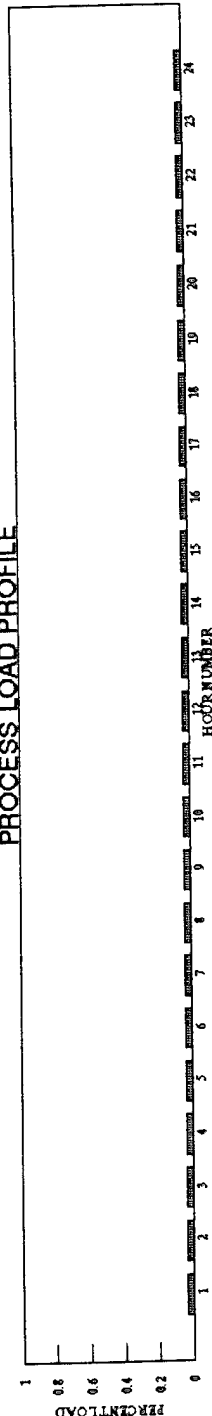
OCCUPANCY PROFILE



LIGHTING LOAD PROFILE



PROCESS LOAD PROFILE



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.900000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORPTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORPTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 127093.000000

FLOOR AREA (SQFT) 4647.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 475000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -360000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 46470.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 604.000000

INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.850000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4250.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 201.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 78.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 1.000000

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1862.0	1458.0	1548.0	1323.0
WINDOW AREA SQFT (AWND)	486.0	.0	253.0	94.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	48.6	.0	25.3	9.4
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.191	.191	.191	.191
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00155	.00155	.00155	.00155
NUMBER OF BN FACTORS (NB	6	6	6	6
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00000	.00000	.00000	.00000
N=3	.00015	.00015	.00015	.00015
N=4	.00064	.00064	.00064	.00064
N=5	.00060	.00060	.00060	.00060
N=6	.00015	.00015	.00015	.00015
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-2.48050	-2.48050	-2.48050	-2.48050
N=3	2.22216	2.22216	2.22216	2.22216
N=4	-.87313	-.87313	-.87313	-.87313
N=5	.14299	.14299	.14299	.14299
N=6	-.00853	-.00853	-.00853	-.00853
ROOF AREA SQFT (AROF)	5313.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.010000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.286793E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000 .000 .476E-03 .114E-02 .572E-03 .953E-04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.98 1.34 -.374 .434E-01 -.170E-02				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.500000E-01		

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	KW	BTU/HR		HEATING	COOLING	
		LIGHTS	PROCESS	PEOPLE SENSIBLE			PEOPLE LATENT
		10.	589.	22500.			
		HOURLY FRACTION OF PEAK					
	1	.040	.040	.040	70.0	75.0	
	2	.040	.040	.040	70.0	75.0	
	3	.040	.040	.040	70.0	75.0	
	4	.040	.040	.040	70.0	75.0	
	5	.040	.040	.040	70.0	75.0	
	6	.040	.040	.040	70.0	75.0	
	7	.040	.040	.040	70.0	75.0	
	8	.040	.040	.040	70.0	75.0	
	9	.040	.040	.040	70.0	75.0	
	10	.040	.040	.040	70.0	75.0	
	11	.040	.040	.040	70.0	75.0	
	12	.040	.040	.040	70.0	75.0	

13	.040	.040	.040	.040	70.0	75.0
14	.040	.040	.040	.040	70.0	75.0
15	.040	.040	.040	.040	70.0	75.0
16	.040	.040	.040	.040	70.0	75.0
17	.040	.040	.040	.040	70.0	75.0
18	.040	.040	.040	.040	70.0	75.0
19	.040	.040	.040	.040	70.0	75.0
20	.040	.040	.040	.040	70.0	75.0
21	.040	.040	.040	.040	70.0	75.0
22	.040	.040	.040	.040	70.0	75.0
23	.040	.040	.040	.040	70.0	75.0
24	.040	.040	.040	.040	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					6970.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					475000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					593750.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.451
.500	.537	.600	.625	.700	.718	.812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					92151.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	16.	0.	0.	0.	0.	0.	0.	0.
	-172.	LOSS		-15.	-7.	0.	-63.	-11.	-96.	0.
FEB	0.	GAIN	18.	0.	0.	0.	0.	0.	0.	0.
	-138.	LOSS		-13.	-6.	0.	-51.	-10.	-81.	0.
MAR	1.	GAIN	23.	0.	0.	0.	0.	0.	0.	0.
	-106.	LOSS		-11.	-6.	0.	-35.	-9.	-72.	0.
APR	9.80	GAIN	21.65	.05	.05	.00	2.67	.08	.54	1.84
	-45.45	LOSS		-6.24	-3.22	.00	-14.39	-5.07	-38.49	.00
MAY	30.65	GAIN	22.60	.34	.15	.00	12.21	.23	1.34	8.22
	-8.50	LOSS		-2.90	-1.82	.00	-1.04	-2.77	-19.48	.00
JUN	82.81	GAIN	22.60	1.00	.41	.00	24.70	.63	3.85	36.44
	-.19	LOSS		-1.01	-.87	.00	.00	-1.32	-8.67	.00
JUL	117.	GAIN	23.	2.	1.	0.	36.	2.	10.	46.
	0.	LOSS		-1.	-1.	0.	0.	-1.	-6.	0.
AUG	106.	GAIN	21.	2.	1.	0.	31.	1.	7.	46.
	0.	LOSS		-1.	-1.	0.	0.	-1.	-6.	0.
SEP	60.20	GAIN	19.56	.56	.37	.00	15.60	.60	3.96	27.50
	-10.54	LOSS		-2.59	-1.42	.00	-1.30	-2.20	-15.84	.00
OCT	10.43	GAIN	17.90	.01	.06	.00	2.04	.09	.59	3.53
	-42.84	LOSS		-6.68	-3.04	.00	-14.38	-4.66	-32.98	.00
NOV	1.44	GAIN	15.90	.00	.01	.00	.00	.01	.09	.44
	-88.98	LOSS		-10.02	-4.57	.00	-34.20	-7.04	-53.09	.00
DEC	0.	GAIN	15.	0.	0.	0.	0.	0.	0.	0.
	-172.	LOSS		-15.	-7.	0.	-67.	-11.	-91.	0.
TOT	419.	GAIN	236.	6.	3.	0.	124.	4.	27.	171.
	-786.	LOSS		-85.	-42.	0.	-282.	-66.	-521.	0.

MAX HEATING LOAD= -475000. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 346002. BTUH ON SEP 2 HOUR 12 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 2313.6

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	69.	74.	67.	1 29	13 7	53. 14.	.23	.09	3.78	5.09
FEB	69.	77.	67.	17 6	13 7	59. 14.	.20	.08	3.41	4.57
MAR	70.	78.	57.	12 24	13 19	74. 69.	.22	.09	3.78	5.05
APR	71.	78.	58.	25 2	12 19	77. 69.	.21	.09	3.66	4.87
MAY	74.	78.	69.	31 11	12 5	80. 39.	.23	.09	3.78	5.09
JUN	76.	78.	70.	29 17	12 5	87. 56.	.21	.09	3.66	4.87
JUL	76.	78.	71.	5 24	12 5	85. 65.	.22	.09	3.78	5.05
AUG	76.	78.	70.	30 26	12 5	86. 57.	.23	.09	3.78	5.09
SEP	74.	79.	69.	25 16	12 17	63. 69.	.20	.08	3.66	4.83
OCT	71.	78.	66.	4 14	12 20	83. 69.	.23	.09	3.78	5.09
NOV	70.	77.	57.	8 7	13 18	77. 69.	.22	.09	3.66	4.92
DEC	68.	75.	66.	23 18	13 7	71. -1.	.21	.09	3.78	5.01
YEAR							2.59	1.06	44.48	59.55

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	741	0	0	0	-.4598E+06	.0000
FEB	666	1	0	0	-.3972E+06	.0000
MAR	681	37	0	0	-.3815E+06	.1158E+06
APR	496	154	0	0	-.2270E+06	.1550E+06
MAY	228	387	0	0	-.1269E+06	.2166E+06
JUN	21	634	0	0	-.1884E+05	.3108E+06
JUL	0	714	0	0	.0000	.3258E+06
AUG	14	703	0	0	-.2885E+05	.3039E+06
SEP	208	454	0	0	-.1195E+06	.3460E+06
OCT	527	146	0	0	-.2061E+06	.2303E+06
NOV	661	33	0	0	-.3162E+06	.1292E+06
DEC	741	0	2	0	-.4750E+06	.0000
YEAR	4984	3263	2	0	-.4750E+06	.3460E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	234.63	.00	.23	.09	1.11	5.09	1.9
FEB	192.80	.00	.20	.08	1.00	4.57	1.9
MAR	159.85	.14	.22	.09	1.11	5.05	11.7
APR	84.28	.92	.21	.09	1.07	4.87	14.0
MAY	28.26	2.70	.23	.09	1.11	5.09	19.1
JUN	2.38	6.91	.21	.09	1.07	4.87	26.6
JUL	.00	9.47	.22	.09	1.11	5.05	27.3
AUG	1.58	8.67	.23	.09	1.11	5.09	25.8
SEP	26.83	5.03	.20	.08	1.07	4.83	28.1
OCT	83.99	.95	.23	.09	1.11	5.09	20.2
NOV	140.11	.15	.22	.09	1.07	4.92	12.5
DEC	234.12	.00	.21	.09	1.11	5.01	1.9
YEAR	1188.82	34.94	2.59	1.06	13.03	59.55	28.1

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 293193. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET	COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1042.	675.	1.000	35.	0.	0.	0	0		.0000	-.4598E+06
FEB	1450.	919.	1.000	37.	0.	0.	0	0		.0000	-.3972E+06
MAR	1886.	1231.	1.000	43.	0.	0.	0	0		.1158E+06	-.3815E+06
APR	2254.	1560.	1.000	55.	0.	0.	0	0		.1550E+06	-.2270E+06
MAY	2493.	1774.	1.000	65.	0.	0.	0	0		.2166E+06	-.1269E+06
JUN	2566.	1934.	1.000	72.	0.	0.	0	0		.3108E+06	-.1884E+05
JUL	2473.	1957.	1.000	77.	0.	0.	0	0		.3258E+06	.0000
AUG	2222.	1793.	1.000	76.	0.	0.	0	0		.3039E+06	-.2885E+05
SEP	1821.	1346.	1.000	68.	0.	0.	0	0		.3460E+06	-.1195E+06
OCT	1423.	943.	1.000	57.	0.	0.	0	0		.2303E+06	-.2061E+06
NOV	1039.	731.	1.000	47.	0.	0.	0	0		.1292E+06	-.3162E+06
DEC	888.	608.	1.000	35.	0.	0.	0	2		.0000	-.4750E+06

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.900000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 127093.000000

FLOOR AREA (SQFT) 4647.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 475000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -360000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 46470.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 604.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.850000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4250.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 201.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 78.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 1.000000

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1862.0	1458.0	1548.0	1323.0
WINDOW AREA SQFT (AWND)	486.0	.0	253.0	94.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	48.6	.0	25.3	9.4
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0

U VALUE BTU/(HR-SQFT-F) (UW)	.191	.191	.191	.191
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00155	.00155	.00155	.00155
NUMBER OF BN FACTORS (NB	6	6	6	6
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00000	.00000	.00000	.00000
N=3	.00015	.00015	.00015	.00015
N=4	.00064	.00064	.00064	.00064
N=5	.00060	.00060	.00060	.00060
N=6	.00015	.00015	.00015	.00015
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-2.48050	-2.48050	-2.48050	-2.48050
N=3	2.22216	2.22216	2.22216	2.22216
N=4	-.87313	-.87313	-.87313	-.87313
N=5	.14299	.14299	.14299	.14299
N=6	-.00853	-.00853	-.00853	-.00853
ROOF AREA SQFT (AROF)	5313.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.010000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.286793E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000 .000 .476E-03 .114E-02 .572E-03 .953E-04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.98 1.34 -.374 .434E-01 -.170E-02				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.500000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 75.0 75.0				
75.0 75.0 75.0 75.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 70.0 70.0				
70.0 70.0 70.0 70.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

	THERMOSTAT SET POINT DEG F			
	HEATING	COOLING		
KW				
BTU/HR				
PEOPLE				
PEOPLE				
LIGHTS				
PROCESS				
SENSIBLE				
LATENT				
PEAK VAL	10.	589.	22500.	10500.

HOUR	HOURLY FRACTION OF PEAK						
1	.040	.040	.040	.040	55.0	90.0	
2	.040	.040	.040	.040	55.0	90.0	
3	.040	.040	.040	.040	55.0	90.0	
4	.040	.040	.040	.040	55.0	90.0	
5	.040	.040	.040	.040	55.0	90.0	
6	.040	.040	.040	.040	55.0	90.0	
7	.040	.040	.040	.040	55.0	90.0	
8	.040	.040	.040	.040	55.0	90.0	
9	.040	.040	.040	.040	55.0	90.0	
10	.040	.040	.040	.040	55.0	90.0	
11	.040	.040	.040	.040	55.0	90.0	
12	.040	.040	.040	.040	55.0	90.0	
13	.040	.040	.040	.040	55.0	90.0	
14	.040	.040	.040	.040	55.0	90.0	
15	.040	.040	.040	.040	55.0	90.0	
16	.040	.040	.040	.040	55.0	90.0	
17	.040	.040	.040	.040	55.0	90.0	
18	.040	.040	.040	.040	55.0	90.0	
19	.040	.040	.040	.040	55.0	90.0	
20	.040	.040	.040	.040	55.0	90.0	
21	.040	.040	.040	.040	55.0	90.0	
22	.040	.040	.040	.040	55.0	90.0	
23	.040	.040	.040	.040	55.0	90.0	
24	.040	.040	.040	.040	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					6970.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					475000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					593750.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					92151.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

		SOLAR		PARTITN				VENT		LATENT
MNTH	LOAD	THRU	ROOF	DOOR	BSMT	WALL	WINDOW	AND	INFL	
JAN	.00	GAIN	15.89	.00	.01	.00	.02	.01	.06	.00
	-92.24	LOSS		-10.31	-4.60	.00	-34.11	-7.23	-57.13	.00
FEB	.00	GAIN	18.08	.00	.01	.00	.00	.02	.13	.00
	-67.12	LOSS		-8.28	-3.84	.00	-23.98	-6.04	-47.77	.00
MAR	.72	GAIN	22.89	.00	.01	.00	.80	.01	.07	.11
	-43.11	LOSS		-7.19	-3.56	.00	-12.00	-5.60	-42.99	.00
APR	3.92	GAIN	21.65	.00	.00	.00	3.81	.01	.04	.81
	-12.48	LOSS		-4.33	-2.28	.00	-3.29	-3.61	-26.20	.00
MAY	14.59	GAIN	22.60	.02	.01	.00	8.27	.02	.13	5.11
	-1.10	LOSS		-3.17	-1.99	.00	-.06	-3.05	-19.46	.00
JUN	35.80	GAIN	22.60	.04	.04	.00	11.33	.07	.41	19.52
	.00	LOSS		-2.36	-1.71	.00	.00	-2.63	-16.34	.00
JUL	48.04	GAIN	22.60	.27	.14	.00	15.07	.22	1.42	24.05
	.00	LOSS		-1.99	-1.54	.00	.00	-2.37	-14.87	.00
AUG	38.52	GAIN	20.82	.10	.08	.00	11.68	.12	.75	20.42
	-.03	LOSS		-2.19	-1.55	.00	.00	-2.36	-14.52	.00
SEP	24.90	GAIN	19.56	.03	.08	.00	8.08	.13	.89	12.67
	-1.36	LOSS		-2.94	-1.53	.00	-.10	-2.39	-15.86	.00
OCT	4.99	GAIN	17.90	.00	.01	.00	1.95	.02	.12	1.81
	-9.86	LOSS		-4.57	-1.89	.00	-2.69	-2.92	-19.70	.00
NOV	.63	GAIN	15.90	.00	.03	.00	.18	.04	.27	.33
	-34.02	LOSS		-6.33	-2.67	.00	-12.65	-4.11	-29.31	.00
DEC	.00	GAIN	15.02	.00	.00	.00	.00	.00	.03	.00
	-90.86	LOSS		-10.25	-4.46	.00	-35.89	-6.93	-53.38	.00
TOT	172.	GAIN	236.	0.	0.	0.	61.	1.	4.	85.
	-352.	LOSS		-64.	-32.	0.	-125.	-49.	-358.	0.

MAX HEATING LOAD= -348893. BTUH ON JAN 27 HOUR 7 AMBIENT TEMP 4.  
 MAX COOLING LOAD= 318877. BTUH ON SEP 2 HOUR 12 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 2313.6

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	56.	79.	53.	5 29	15 7	64. 14.	.23	.09	3.78	5.09
FEB	57.	88.	53.	17 20	13 6	59. 15.	.20	.08	3.41	4.57
MAR	60.	93.	53.	12 4	13 6	74. 15.	.22	.09	3.78	5.05
APR	67.	93.	54.	25 1	12 1	77. 33.	.21	.09	3.66	4.87
MAY	75.	93.	55.	29 12	12 3	85. 41.	.23	.09	3.78	5.09
JUN	82.	93.	61.	29 16	12 4	87. 55.	.21	.09	3.66	4.87
JUL	85.	93.	65.	27 10	12 5	90. 57.	.22	.09	3.78	5.05
AUG	83.	93.	57.	30 25	12 6	86. 51.	.23	.09	3.78	5.09
SEP	76.	93.	55.	10 15	12 6	85. 39.	.20	.08	3.66	4.83
OCT	66.	93.	54.	4 28	12 5	83. 31.	.23	.09	3.78	5.09
NOV	61.	92.	54.	8 3	13 6	77. 18.	.22	.09	3.66	4.92
DEC	56.	85.	53.	23 18	13 7	71. -1.	.21	.09	3.78	5.01
YEAR							2.59	1.06	44.48	59.55

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 NIGHT SETBACK (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	661	0	0	0	-.3489E+06	.0000
FEB	578	4	0	0	-.2687E+06	.0000
MAR	523	29	0	0	-.3069E+06	.7068E+05
APR	264	86	0	0	-.1313E+06	.1589E+06
MAY	47	185	0	0	-.4714E+05	.1955E+06
JUN	0	276	0	0	.0000	.2798E+06
JUL	0	350	0	0	.0000	.2899E+06
AUG	2	303	0	0	-.2350E+05	.2720E+06
SEP	79	194	0	0	-.7964E+05	.3189E+06
OCT	286	74	0	0	-.1537E+06	.1699E+06
NOV	452	19	0	0	-.2504E+06	.9055E+05
DEC	694	0	0	0	-.3419E+06	.0000
YEAR	3586	1520	0	0	-.3489E+06	.3189E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	143.28	.00	.23	.09	1.11	5.09	1.9
FEB	111.72	.00	.20	.08	1.00	4.57	1.9
MAR	83.83	.08	.22	.09	1.11	5.05	8.5
APR	33.88	.40	.21	.09	1.07	4.87	14.3
MAY	5.32	1.35	.23	.09	1.11	5.09	17.0
JUN	.00	2.99	.21	.09	1.07	4.87	24.0
JUL	.00	3.99	.22	.09	1.11	5.05	24.8
AUG	.23	3.22	.23	.09	1.11	5.09	23.4
SEP	9.01	2.08	.20	.08	1.07	4.83	26.8
OCT	34.39	.46	.23	.09	1.11	5.09	15.2
NOV	69.24	.07	.22	.09	1.07	4.92	10.1
DEC	143.92	.00	.21	.09	1.11	5.01	1.9
YEAR	634.81	14.66	2.59	1.06	13.03	59.55	26.8

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 159075. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	DAY	DAY			+	-	COOL	HEAT		
JAN	1042.	675.	1.000	35.	0.	0.	0	0	.0000	-.3489E+06
FEB	1450.	919.	1.000	37.	0.	0.	0	0	.0000	-.2687E+06
MAR	1886.	1231.	1.000	43.	0.	0.	0	0	.7068E+05	-.3069E+06
APR	2254.	1560.	1.000	55.	0.	0.	0	0	.1589E+06	-.1313E+06
MAY	2493.	1774.	1.000	65.	0.	0.	0	0	.1955E+06	-.4714E+05
JUN	2566.	1934.	1.000	72.	0.	0.	0	0	.2798E+06	.0000
JUL	2473.	1957.	1.000	77.	0.	0.	0	0	.2899E+06	.0000
AUG	2222.	1793.	1.000	76.	0.	0.	0	0	.2720E+06	-.2350E+05
SEP	1821.	1346.	1.000	68.	0.	0.	0	0	.3189E+06	-.7964E+05
OCT	1423.	943.	1.000	57.	0.	0.	0	0	.1699E+06	-.1537E+06
NOV	1039.	731.	1.000	47.	0.	0.	0	0	.9055E+05	-.2504E+06
DEC	888.	608.	1.000	35.	0.	0.	0	0	.0000	-.3419E+06

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.900000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 127093.000000

FLOOR AREA (SQFT) 4647.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 475000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -360000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 46470.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 604.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.850000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4250.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 201.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 78.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 1.000000

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1862.0	1458.0	1548.0	1323.0
WINDOW AREA SQFT (AWND)	486.0	.0	253.0	94.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	48.6	.0	25.3	9.4
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.191	.191	.191	.191
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00155	.00155	.00155	.00155
NUMBER OF BN FACTORS (NB	6	6	6	6
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00000	.00000	.00000	.00000
N=3	.00015	.00015	.00015	.00015
N=4	.00064	.00064	.00064	.00064
N=5	.00060	.00060	.00060	.00060
N=6	.00015	.00015	.00015	.00015
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-2.48050	-2.48050	-2.48050	-2.48050
N=3	2.22216	2.22216	2.22216	2.22216
N=4	-.87313	-.87313	-.87313	-.87313
N=5	.14299	.14299	.14299	.14299
N=6	-.00853	-.00853	-.00853	-.00853
ROOF AREA SQFT (AROF)	5313.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.010000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	2.286793E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000 .000 .476E-03 .114E-02 .572E-03 .953E-04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.98 1.34 -.374 .434E-01 -.170E-02				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.500000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 78.0 78.0				
78.0 78.0 78.0 78.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 68.0 68.0				
68.0 68.0 68.0 68.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	- - - - -	BTU/HR	- - - - -		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	10.	589.	22500.	10500.			
HOUR	HOURLY FRACTION OF PEAK						
1	.040	.040	.040	.040	55.0	90.0	
2	.040	.040	.040	.040	55.0	90.0	
3	.040	.040	.040	.040	55.0	90.0	
4	.040	.040	.040	.040	55.0	90.0	
5	.040	.040	.040	.040	55.0	90.0	
6	.040	.040	.040	.040	55.0	90.0	
7	.040	.040	.040	.040	55.0	90.0	
8	.040	.040	.040	.040	55.0	90.0	
9	.040	.040	.040	.040	55.0	90.0	
10	.040	.040	.040	.040	55.0	90.0	
11	.040	.040	.040	.040	55.0	90.0	
12	.040	.040	.040	.040	55.0	90.0	
13	.040	.040	.040	.040	55.0	90.0	
14	.040	.040	.040	.040	55.0	90.0	
15	.040	.040	.040	.040	55.0	90.0	
16	.040	.040	.040	.040	55.0	90.0	
17	.040	.040	.040	.040	55.0	90.0	
18	.040	.040	.040	.040	55.0	90.0	
19	.040	.040	.040	.040	55.0	90.0	
20	.040	.040	.040	.040	55.0	90.0	
21	.040	.040	.040	.040	55.0	90.0	
22	.040	.040	.040	.040	55.0	90.0	
23	.040	.040	.040	.040	55.0	90.0	
24	.040	.040	.040	.040	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					6970.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					475000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					593750.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					92151.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	15.89	.00	.01	.00	.02	.01	.06	.00
	-91.40	LOSS		-10.26	-4.58	.00	-33.82	-7.19	-56.70	.00
FEB	.00	GAIN	18.08	.00	.01	.00	.00	.02	.13	.00
	-66.46	LOSS		-8.25	-3.82	.00	-23.77	-6.01	-47.41	.00
MAR	.68	GAIN	22.89	.00	.01	.00	.79	.01	.07	.11
	-42.64	LOSS		-7.17	-3.54	.00	-11.88	-5.58	-42.70	.00
APR	3.79	GAIN	21.65	.00	.00	.00	3.77	.01	.04	.81
	-12.16	LOSS		-4.33	-2.28	.00	-3.21	-3.61	-26.05	.00
MAY	14.07	GAIN	22.60	.01	.00	.00	8.05	.01	.04	5.03
	-1.08	LOSS		-3.20	-2.00	.00	-.06	-3.06	-19.50	.00
JUN	34.89	GAIN	22.60	.03	.02	.00	11.06	.03	.18	19.25
	.00	LOSS		-2.40	-1.72	.00	.00	-2.64	-16.36	.00
JUL	46.75	GAIN	22.60	.25	.10	.00	14.70	.17	1.06	23.56
	.00	LOSS		-2.03	-1.53	.00	.00	-2.36	-14.80	.00
AUG	37.83	GAIN	20.82	.08	.05	.00	11.41	.08	.50	20.29
	-.02	LOSS		-2.22	-1.54	.00	.00	-2.35	-14.46	.00
SEP	24.16	GAIN	19.56	.02	.05	.00	7.85	.09	.60	12.48
	-1.33	LOSS		-2.97	-1.53	.00	-.11	-2.38	-15.74	.00
OCT	4.87	GAIN	17.90	.00	.01	.00	1.90	.02	.10	1.82
	-9.67	LOSS		-4.58	-1.89	.00	-2.67	-2.92	-19.59	.00
NOV	.63	GAIN	15.90	.00	.03	.00	.19	.04	.26	.33
	-33.53	LOSS		-6.30	-2.65	.00	-12.48	-4.08	-29.06	.00
DEC	.00	GAIN	15.02	.00	.00	.00	.00	.00	.03	.00
	-89.97	LOSS		-10.19	-4.43	.00	-35.57	-6.88	-52.96	.00
TOT	168.	GAIN	236.	0.	0.	0.	60.	0.	3.	84.
	-348.	LOSS		-64.	-32.	0.	-124.	-49.	-355.	0.

MAX HEATING LOAD= -341482. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 301743. BTUH ON SEP 2 HOUR 12 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 2313.6

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	56.	79.	53.	5 29	15 7	64. 14.	.23	.09	3.78	5.09
FEB	57.	89.	53.	17 20	13 6	59. 15.	.20	.08	3.41	4.57
MAR	60.	93.	53.	12 4	13 6	74. 15.	.22	.09	3.78	5.05
APR	67.	93.	54.	25 1	12 1	77. 33.	.21	.09	3.66	4.87
MAY	75.	93.	55.	29 12	12 3	85. 41.	.23	.09	3.78	5.09
JUN	82.	93.	61.	29 16	12 4	87. 55.	.21	.09	3.66	4.87
JUL	85.	93.	65.	27 10	12 5	90. 57.	.22	.09	3.78	5.05
AUG	84.	93.	57.	30 25	12 6	86. 51.	.23	.09	3.78	5.09
SEP	76.	93.	55.	10 15	12 6	85. 39.	.20	.08	3.66	4.83
OCT	66.	93.	54.	4 28	12 5	83. 31.	.23	.09	3.78	5.09
NOV	61.	92.	54.	8 3	13 6	77. 18.	.22	.09	3.66	4.92
DEC	56.	86.	53.	23 18	13 7	71. -1.	.21	.09	3.78	5.01
YEAR							2.59	1.06	44.48	59.55

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 DDC (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	661	0	0	0	-.3411E+06	.0000
FEB	578	2	0	0	-.2593E+06	.0000
MAR	523	29	0	0	-.2935E+06	.6438E+05
APR	259	82	0	0	-.1236E+06	.1473E+06
MAY	47	180	0	0	-.4716E+05	.1841E+06
JUN	0	273	0	0	.0000	.2651E+06
JUL	0	345	0	0	.0000	.2759E+06
AUG	1	301	0	0	-.1575E+05	.2576E+06
SEP	78	192	0	0	-.7189E+05	.3017E+06
OCT	284	73	0	0	-.1455E+06	.1677E+06
NOV	450	18	0	0	-.2426E+06	.9062E+05
DEC	693	0	0	0	-.3415E+06	.0000
YEAR	3574	1495	0	0	-.3415E+06	.3017E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	142.40	.00	.23	.09	1.11	5.09	1.9
FEB	111.07	.00	.20	.08	1.00	4.57	1.9
MAR	83.41	.08	.22	.09	1.11	5.05	8.4
APR	33.13	.39	.21	.09	1.07	4.87	13.5
MAY	5.32	1.31	.23	.09	1.11	5.09	16.2
JUN	.00	2.92	.21	.09	1.07	4.87	22.8
JUL	.00	3.88	.22	.09	1.11	5.05	23.7
AUG	.11	3.17	.23	.09	1.11	5.09	22.2
SEP	8.88	2.02	.20	.08	1.07	4.83	25.7
OCT	34.04	.45	.23	.09	1.11	5.09	15.2
NOV	68.61	.07	.22	.09	1.07	4.92	10.1
DEC	142.98	.00	.21	.09	1.11	5.01	1.9
YEAR	629.95	14.31	2.59	1.06	13.03	59.55	25.7

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 157771. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1042.	675.	1.000	35.	0.	0.	0	0	.0000	-.3411E+06
FEB	1450.	919.	1.000	37.	0.	0.	0	0	.0000	-.2593E+06
MAR	1886.	1231.	1.000	43.	0.	0.	0	0	.6438E+05	-.2935E+06
APR	2254.	1560.	1.000	55.	0.	0.	0	0	.1473E+06	-.1236E+06
MAY	2493.	1774.	1.000	65.	0.	0.	0	0	.1841E+06	-.4716E+05
JUN	2566.	1934.	1.000	72.	0.	0.	0	0	.2651E+06	.0000
JUL	2473.	1957.	1.000	77.	0.	0.	0	0	.2759E+06	.0000
AUG	2222.	1793.	1.000	76.	0.	0.	0	0	.2576E+06	-.1575E+05
SEP	1821.	1346.	1.000	68.	0.	0.	0	0	.3017E+06	-.7189E+05
OCT	1423.	943.	1.000	57.	0.	0.	0	0	.1677E+06	-.1455E+06
NOV	1039.	731.	1.000	47.	0.	0.	0	0	.9062E+05	-.2426E+06
DEC	888.	608.	1.000	35.	0.	0.	0	0	.0000	-.3415E+06

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 ECONOMIZER (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.900000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 127093.000000

FLOOR AREA (SQFT) 4647.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 475000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -360000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 46470.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 604.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.850000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4250.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 201.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 78.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 1.000000

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1862.0	1458.0	1548.0	1323.0
WINDOW AREA SQFT (AWND)	486.0	.0	253.0	94.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	48.6	.0	25.3	9.4
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.191	.191	.191	.191
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00155	.00155	.00155	.00155
NUMBER OF BN FACTORS (NB	6	6	6	6
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00000	.00000	.00000	.00000
N=3	.00015	.00015	.00015	.00015
N=4	.00064	.00064	.00064	.00064
N=5	.00060	.00060	.00060	.00060
N=6	.00015	.00015	.00015	.00015
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-2.48050	-2.48050	-2.48050	-2.48050
N=3	2.22216	2.22216	2.22216	2.22216
N=4	-.87313	-.87313	-.87313	-.87313
N=5	.14299	.14299	.14299	.14299
N=6	-.00853	-.00853	-.00853	-.00853
ROOF AREA SQFT (AROF)	5313.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.010000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	2.286793E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000 .000 .476E-03 .114E-02 .572E-03 .953E-04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.98 1.34 -.374 .434E-01 -.170E-02				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.500000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 78.0 78.0				
78.0 78.0 78.0 78.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 68.0 68.0				
68.0 68.0 68.0 68.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	-	-	-	-	-	-	-	-
	PEOPLE	PEOPLE						
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING			

PEAK VAL	10.	589.	22500.	10500.			
HOUR	HOURLY FRACTION OF PEAK						
1	.040	.040	.040	.040	55.0	90.0	
2	.040	.040	.040	.040	55.0	90.0	
3	.040	.040	.040	.040	55.0	90.0	
4	.040	.040	.040	.040	55.0	90.0	
5	.040	.040	.040	.040	55.0	90.0	
6	.040	.040	.040	.040	55.0	90.0	
7	.040	.040	.040	.040	55.0	90.0	
8	.040	.040	.040	.040	55.0	90.0	
9	.040	.040	.040	.040	55.0	90.0	
10	.040	.040	.040	.040	55.0	90.0	
11	.040	.040	.040	.040	55.0	90.0	
12	.040	.040	.040	.040	55.0	90.0	
13	.040	.040	.040	.040	55.0	90.0	
14	.040	.040	.040	.040	55.0	90.0	
15	.040	.040	.040	.040	55.0	90.0	
16	.040	.040	.040	.040	55.0	90.0	
17	.040	.040	.040	.040	55.0	90.0	
18	.040	.040	.040	.040	55.0	90.0	
19	.040	.040	.040	.040	55.0	90.0	
20	.040	.040	.040	.040	55.0	90.0	
21	.040	.040	.040	.040	55.0	90.0	
22	.040	.040	.040	.040	55.0	90.0	
23	.040	.040	.040	.040	55.0	90.0	
24	.040	.040	.040	.040	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					6970.000000		
ECONOMIZER HIGH TEMP LIMIT F					75.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					475000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					593750.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					92151.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 ECONOMIZER (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	15.89	.00	.01	.00	.02	.01	.06	.00
	-91.40	LOSS		-10.26	-4.58	.00	-33.82	-7.19	-56.70	.00
FEB	.00	GAIN	18.08	.00	.01	.00	.00	.02	.13	.00
	-66.46	LOSS		-8.25	-3.82	.00	-23.77	-6.01	-47.41	.00
MAR	.03	GAIN	22.89	.00	.01	.00	.79	.01	.07	.00
	-42.64	LOSS		-7.17	-3.54	.00	-11.88	-5.58	-43.24	.00
APR	1.86	GAIN	21.65	.00	.00	.00	3.77	.01	.04	.28
	-12.16	LOSS		-4.33	-2.28	.00	-3.21	-3.61	-27.45	.00
MAY	11.58	GAIN	22.60	.01	.00	.00	8.05	.01	.04	4.99
	-1.08	LOSS		-3.20	-2.00	.00	-.06	-3.06	-21.95	.00
JUN	33.50	GAIN	22.60	.03	.02	.00	11.05	.03	.18	19.22
	.00	LOSS		-2.40	-1.72	.00	.00	-2.64	-17.71	.00
JUL	46.59	GAIN	22.60	.25	.10	.00	14.70	.17	1.06	24.14
	.00	LOSS		-2.03	-1.53	.00	.00	-2.36	-15.54	.00
AUG	36.68	GAIN	20.82	.08	.05	.00	11.41	.08	.50	20.02
	-.02	LOSS		-2.22	-1.54	.00	.00	-2.35	-15.33	.00
SEP	23.37	GAIN	19.56	.02	.05	.00	7.85	.09	.60	12.82
	-1.33	LOSS		-2.97	-1.53	.00	-.11	-2.38	-16.88	.00
OCT	4.05	GAIN	17.90	.00	.01	.00	1.90	.02	.10	1.75
	-9.67	LOSS		-4.58	-1.89	.00	-2.67	-2.92	-20.34	.00
NOV	.21	GAIN	15.90	.00	.03	.00	.19	.04	.26	.10
	-33.53	LOSS		-6.30	-2.65	.00	-12.48	-4.08	-29.25	.00
DEC	.00	GAIN	15.02	.00	.00	.00	.00	.00	.03	.00
	-89.97	LOSS		-10.19	-4.43	.00	-35.57	-6.88	-52.96	.00
TOT	158.	GAIN	236.	0.	0.	0.	60.	0.	3.	83.
	-348.	LOSS		-64.	-32.	0.	-124.	-49.	-365.	0.

MAX HEATING LOAD= -341482. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 360000. BTUH ON JUN 23 HOUR 10 AMBIENT TEMP 74.

ZONE UA BTU/HR-F 2313.6

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 ECONOMIZER (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	56.	79.	53.	5 29	15 7	64. 14.	.23	.09	3.78	5.09
FEB	57.	89.	53.	17 20	13 6	59. 15.	.20	.08	3.41	4.57
MAR	60.	93.	53.	12 4	13 6	74. 15.	.22	.09	3.78	5.05
APR	67.	93.	54.	25 1	12 1	77. 33.	.21	.09	3.66	4.87
MAY	75.	93.	55.	29 12	12 3	85. 41.	.23	.09	3.78	5.09
JUN	82.	93.	61.	29 16	12 4	87. 55.	.21	.09	3.66	4.87
JUL	85.	93.	65.	27 10	12 5	90. 57.	.22	.09	3.78	5.05
AUG	84.	93.	57.	30 25	12 6	86. 51.	.23	.09	3.78	5.09
SEP	76.	93.	55.	10 15	12 6	85. 39.	.20	.08	3.66	4.83
OCT	66.	93.	54.	4 28	12 5	83. 31.	.23	.09	3.78	5.09
NOV	61.	92.	54.	8 3	13 6	77. 18.	.22	.09	3.66	4.92
DEC	56.	86.	53.	23 18	13 7	71. -1.	.21	.09	3.78	5.01
YEAR							2.59	1.06	44.48	59.55

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 ECONOMIZER (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	661	0	0	0	-.3411E+06	.0000
FEB	578	2	0	0	-.2593E+06	.0000
MAR	523	29	0	0	-.2935E+06	.2623E+05
APR	259	82	0	0	-.1236E+06	.1769E+06
MAY	47	180	0	0	-.4716E+05	.2456E+06
JUN	0	273	0	1	.0000	.3600E+06
JUL	0	345	0	0	.0000	.3304E+06
AUG	1	301	0	0	-.1575E+05	.2971E+06
SEP	78	192	0	0	-.7189E+05	.3148E+06
OCT	284	73	0	0	-.1455E+06	.1993E+06
NOV	450	18	0	0	-.2426E+06	.9062E+05
DEC	693	0	0	0	-.3415E+06	.0000
YEAR	3574	1495	0	1	-.3415E+06	.3600E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	142.40	.00	.23	.09	1.11	5.09	1.9
FEB	111.07	.00	.20	.08	1.00	4.57	1.9
MAR	83.41	.00	.22	.09	1.11	5.05	5.4
APR	33.13	.19	.21	.09	1.07	4.87	15.6
MAY	5.32	1.03	.23	.09	1.11	5.09	21.2
JUN	.00	2.76	.21	.09	1.07	4.87	28.6
JUL	.00	3.85	.22	.09	1.11	5.05	27.4
AUG	.11	3.05	.23	.09	1.11	5.09	25.3
SEP	8.88	1.91	.20	.08	1.07	4.83	26.6
OCT	34.04	.35	.23	.09	1.11	5.09	17.3
NOV	68.61	.02	.22	.09	1.07	4.92	10.1
DEC	142.98	.00	.21	.09	1.11	5.01	1.9
YEAR	629.95	13.17	2.59	1.06	13.03	59.55	28.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 156936. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 ECONOMIZER (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1042.	675.	1.000	35.	0.	0.	0	0	.0000	-.3411E+06
FEB	1450.	919.	1.000	37.	0.	0.	0	0	.0000	-.2593E+06
MAR	1886.	1231.	1.000	43.	0.	0.	0	0	.2623E+05	-.2935E+06
APR	2254.	1560.	1.000	55.	0.	0.	0	0	.1769E+06	-.1236E+06
MAY	2493.	1774.	1.000	65.	0.	0.	0	0	.2456E+06	-.4716E+05
JUN	2566.	1934.	1.000	72.	0.	0.	1	0	.3600E+06	.0000
JUL	2473.	1957.	1.000	77.	0.	0.	0	0	.3304E+06	.0000
AUG	2222.	1793.	1.000	76.	0.	0.	0	0	.2971E+06	-.1575E+05
SEP	1821.	1346.	1.000	68.	0.	0.	0	0	.3148E+06	-.7189E+05
OCT	1423.	943.	1.000	57.	0.	0.	0	0	.1993E+06	-.1455E+06
NOV	1039.	731.	1.000	47.	0.	0.	0	0	.9062E+05	-.2426E+06
DEC	888.	608.	1.000	35.	0.	0.	0	0	.0000	-.3415E+06

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.900000E-01  
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
NUMBER OF ZONES (NZ) 1  
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 127093.000000

FLOOR AREA (SQFT) 4647.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 475000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -360000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 46470.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 604.000000

INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 2.850000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4250.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 201.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 78.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 1.000000

WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1862.0	1458.0	1548.0	1323.0
WINDOW AREA SQFT (AWND)	486.0	.0	253.0	94.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	48.6	.0	25.3	9.4
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

		KW		BTU/HR					
				PEOPLE		PEOPLE			
		LIGHTS	PROCESS	SENSIBLE	LATENT			HEATING	COOLING
PEAK VAL	10.	589.	22500.	10500.					
HOUR	- - - - - HOURLY FRACTION OF PEAK - - - - -								
1	.040	.040	.040	.040			70.0	75.0	
2	.040	.040	.040	.040			70.0	75.0	
3	.040	.040	.040	.040			70.0	75.0	
4	.040	.040	.040	.040			70.0	75.0	
5	.040	.040	.040	.040			70.0	75.0	
6	.040	.040	.040	.040			70.0	75.0	
7	.040	.040	.040	.040			70.0	75.0	
8	.040	.040	.040	.040			70.0	75.0	
9	.040	.040	.040	.040			70.0	75.0	
10	.040	.040	.040	.040			70.0	75.0	
11	.040	.040	.040	.040			70.0	75.0	
12	.040	.040	.040	.040			70.0	75.0	

13	.040	.040	.040	.040	70.0	75.0
14	.040	.040	.040	.040	70.0	75.0
15	.040	.040	.040	.040	70.0	75.0
16	.040	.040	.040	.040	70.0	75.0
17	.040	.040	.040	.040	70.0	75.0
18	.040	.040	.040	.040	70.0	75.0
19	.040	.040	.040	.040	70.0	75.0
20	.040	.040	.040	.040	70.0	75.0
21	.040	.040	.040	.040	70.0	75.0
22	.040	.040	.040	.040	70.0	75.0
23	.040	.040	.040	.040	70.0	75.0
24	.040	.040	.040	.040	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					6970.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					475000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					593750.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400
						.451
.500	.537	.600	.625	.700	.718	.800
						.812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					92151.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
						.000
.000	.000	.000	.000	.000	.000	.000
						.000
.000	.000	.000	.000			



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	16.	0.	0.	0.	0.	0.	0.	0.
	-161.	LOSS		-15.	-7.	0.	-63.	-11.	-84.	0.
FEB	0.	GAIN	18.	0.	0.	0.	0.	0.	0.	0.
	-129.	LOSS		-13.	-6.	0.	-51.	-10.	-71.	0.
MAR	1.37	GAIN	22.89	.00	.02	.00	.03	.03	.19	.12
	-97.36	LOSS		-11.24	-5.68	.00	-35.31	-8.93	-63.16	.00
APR	9.77	GAIN	21.65	.05	.05	.00	2.59	.08	.51	1.82
	-40.40	LOSS		-6.26	-3.23	.00	-14.42	-5.09	-33.25	.00
MAY	29.97	GAIN	22.60	.32	.15	.00	11.72	.23	1.27	7.58
	-6.63	LOSS		-2.98	-1.87	.00	-1.09	-2.84	-16.84	.00
JUN	79.01	GAIN	22.60	.99	.41	.00	24.47	.63	3.67	32.10
	-.05	LOSS		-1.04	-.89	.00	.00	-1.35	-7.49	.00
JUL	110.	GAIN	23.	2.	1.	0.	36.	2.	9.	40.
	0.	LOSS		-1.	-1.	0.	0.	-1.	-5.	0.
AUG	99.01	GAIN	20.82	1.60	.74	.00	30.52	1.13	6.46	39.42
	-.09	LOSS		-.55	-.58	.00	.00	-.89	-4.85	.00
SEP	57.31	GAIN	19.56	.56	.37	.00	15.50	.60	3.80	24.37
	-8.58	LOSS		-2.61	-1.43	.00	-1.31	-2.21	-13.31	.00
OCT	10.42	GAIN	17.90	.01	.06	.00	1.98	.09	.58	3.44
	-38.04	LOSS		-6.69	-3.05	.00	-14.41	-4.68	-27.96	.00
NOV	1.44	GAIN	15.90	.00	.01	.00	.00	.01	.08	.44
	-81.59	LOSS		-10.03	-4.58	.00	-34.22	-7.04	-45.66	.00
DEC	0.	GAIN	15.	0.	0.	0.	0.	0.	0.	0.
	-161.	LOSS		-15.	-7.	0.	-67.	-11.	-80.	0.
TOT	398.	GAIN	236.	6.	3.	0.	123.	4.	26.	149.
	-723.	LOSS		-86.	-42.	0.	-282.	-66.	-454.	0.

MAX HEATING LOAD= -466331. BTUH ON DEC 18 HOUR 8 AMBIENT TEMP 1.  
MAX COOLING LOAD= 345973. BTUH ON SEP 2 HOUR 12 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 2313.6

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	69.	74.	67.	1 29	13 7	53. 14.	.23	.09	3.78	5.09
FEB	69.	77.	67.	17 6	13 7	59. 14.	.20	.08	3.41	4.57
MAR	70.	78.	55.	12 24	13 19	74. 69.	.22	.09	3.78	5.05
APR	71.	78.	57.	25 2	12 19	77. 69.	.21	.09	3.66	4.87
MAY	74.	78.	69.	31 11	12 5	80. 39.	.23	.09	3.78	5.09
JUN	76.	78.	70.	29 17	12 5	87. 56.	.21	.09	3.66	4.87
JUL	76.	78.	72.	5 24	12 5	85. 65.	.22	.09	3.78	5.05
AUG	76.	78.	70.	30 26	12 5	86. 57.	.23	.09	3.78	5.09
SEP	74.	79.	69.	25 16	12 6	63. 43.	.20	.08	3.66	4.83
OCT	71.	78.	65.	4 14	12 20	83. 69.	.23	.09	3.78	5.09
NOV	70.	77.	55.	8 7	13 18	77. 69.	.22	.09	3.66	4.92
DEC	68.	75.	67.	23 18	13 7	71. -1.	.21	.09	3.78	5.01
YEAR							2.59	1.06	44.48	59.55

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	741	0	0	0	-.4146E+06	.0000
FEB	666	1	0	0	-.3648E+06	.0000
MAR	681	37	0	0	-.3527E+06	.1157E+06
APR	489	157	0	0	-.1996E+06	.1547E+06
MAY	200	413	0	0	-.1060E+06	.2163E+06
JUN	12	663	0	0	-.1123E+05	.3108E+06
JUL	0	726	0	0	.0000	.3257E+06
AUG	9	714	0	0	-.1744E+05	.3039E+06
SEP	201	459	0	0	-.9913E+05	.3460E+06
OCT	523	153	0	0	-.1797E+06	.2295E+06
NOV	661	33	0	0	-.2806E+06	.1293E+06
DEC	741	0	0	0	-.4663E+06	.0000
YEAR	4924	3356	0	0	-.4663E+06	.3460E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	221.77	.00	.23	.09	1.11	5.09	1.9
FEB	182.19	.00	.20	.08	1.00	4.57	1.9
MAR	150.26	.14	.22	.09	1.11	5.05	11.7
APR	78.82	.92	.21	.09	1.07	4.87	14.0
MAY	24.19	2.67	.23	.09	1.11	5.09	19.0
JUN	1.24	6.67	.21	.09	1.07	4.87	26.6
JUL	.00	9.00	.22	.09	1.11	5.05	27.3
AUG	1.02	8.20	.23	.09	1.11	5.09	25.8
SEP	24.54	4.84	.20	.08	1.07	4.83	28.1
OCT	78.73	.96	.23	.09	1.11	5.09	20.1
NOV	132.31	.15	.22	.09	1.07	4.92	12.6
DEC	221.49	.00	.21	.09	1.11	5.01	1.9
YEAR	1116.55	33.55	2.59	1.06	13.03	59.55	28.1

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 276620. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (NIGHTTIME) (FT LEONARD  
WO

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX SYSTEM TEMP. DRIFT DEG. F + -	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1042.	675.	1.000	35.	0. 0.	0 0	.0000	-.4146E+06
FEB	1450.	919.	1.000	37.	0. 0.	0 0	.0000	-.3648E+06
MAR	1886.	1231.	1.000	43.	0. 0.	0 0	.1157E+06	-.3527E+06
APR	2254.	1560.	1.000	55.	0. 0.	0 0	.1547E+06	-.1996E+06
MAY	2493.	1774.	1.000	65.	0. 0.	0 0	.2163E+06	-.1060E+06
JUN	2566.	1934.	1.000	72.	0. 0.	0 0	.3108E+06	-.1123E+05
JUL	2473.	1957.	1.000	77.	0. 0.	0 0	.3257E+06	.0000
AUG	2222.	1793.	1.000	76.	0. 0.	0 0	.3039E+06	-.1744E+05
SEP	1821.	1346.	1.000	68.	0. 0.	0 0	.3460E+06	-.9913E+05
OCT	1423.	943.	1.000	57.	0. 0.	0 0	.2295E+06	-.1797E+06
NOV	1039.	731.	1.000	47.	0. 0.	0 0	.1293E+06	-.2806E+06
DEC	888.	608.	1.000	35.	0. 0.	0 0	.0000	-.4663E+06

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.900000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 127093.000000

FLOOR AREA (SQFT) 4647.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 475000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -360000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 46470.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 604.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.850000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4250.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 201.000000

PARTITION UA FACTOR BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 78.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 1.000000

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	1862.0	1458.0	1548.0	1323.0
WINDOW AREA SQFT (AWND)	486.0	.0	253.0	94.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	48.6	.0	25.3	9.4
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0



14	.040	.040	.040	.040	70.0	75.0
15	.040	.040	.040	.040	70.0	75.0
16	.040	.040	.040	.040	70.0	75.0
17	.040	.040	.040	.040	70.0	75.0
18	.040	.040	.040	.040	70.0	75.0
19	.040	.040	.040	.040	70.0	75.0
20	.040	.040	.040	.040	70.0	75.0
21	.040	.040	.040	.040	70.0	75.0
22	.040	.040	.040	.040	70.0	75.0
23	.040	.040	.040	.040	70.0	75.0
24	.040	.040	.040	.040	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					6970.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.000000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					475000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					593750.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400
.500	.537	.600	.625	.700	.718	.800
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					360000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					92151.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			



BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	16.	0.	0.	0.	0.	0.	0.	0.
	-166.	LOSS		-15.	-7.	0.	-63.	-11.	-90.	0.
FEB	0.	GAIN	18.	0.	0.	0.	0.	0.	0.	0.
	-133.	LOSS		-13.	-6.	0.	-51.	-10.	-76.	0.
MAR	1.	GAIN	23.	0.	0.	0.	0.	0.	0.	0.
	-102.	LOSS		-11.	-6.	0.	-35.	-9.	-68.	0.
APR	9.57	GAIN	21.65	.05	.05	.00	2.65	.08	.46	1.54
	-43.89	LOSS		-6.26	-3.23	.00	-14.49	-5.08	-36.60	.00
MAY	29.34	GAIN	22.60	.34	.15	.00	12.19	.23	1.08	6.95
	-8.43	LOSS		-2.91	-1.83	.00	-1.08	-2.78	-19.09	.00
JUN	78.10	GAIN	22.60	1.00	.41	.00	24.70	.63	3.15	32.27
	-.19	LOSS		-1.01	-.87	.00	.00	-1.32	-8.51	.00
JUL	111.	GAIN	23.	2.	1.	0.	36.	2.	8.	42.
	0.	LOSS		-1.	-1.	0.	0.	-1.	-6.	0.
AUG	101.	GAIN	21.	2.	1.	0.	31.	1.	6.	42.
	0.	LOSS		-1.	-1.	0.	0.	-1.	-6.	0.
SEP	56.97	GAIN	19.56	.56	.37	.00	15.58	.60	3.31	24.76
	-10.42	LOSS		-2.60	-1.43	.00	-1.34	-2.21	-15.47	.00
OCT	9.93	GAIN	17.90	.01	.06	.00	2.03	.09	.47	3.01
	-41.53	LOSS		-6.70	-3.05	.00	-14.50	-4.68	-31.33	.00
NOV	1.43	GAIN	15.90	.00	.01	.00	.00	.01	.09	.36
	-85.91	LOSS		-10.04	-4.58	.00	-34.30	-7.05	-49.80	.00
DEC	0.	GAIN	15.	0.	0.	0.	0.	0.	0.	0.
	-166.	LOSS		-15.	-7.	0.	-67.	-11.	-86.	0.
TOT	399.	GAIN	236.	6.	3.	0.	124.	4.	23.	153.
	-759.	LOSS		-86.	-42.	0.	-283.	-66.	-492.	0.

MAX HEATING LOAD= -475000. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 315378. BTUH ON SEP 2 HOUR 12 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 2313.6

BEACON Energy Analysis By Energy Systems Engineers, Inc.

637A-5.I

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	69.	77.	67.	1 29	13 7	53. 14.	.23	.09	3.78	5.09
FEB	69.	77.	67.	17 6	13 7	59. 14.	.20	.08	3.41	4.57
MAR	70.	78.	57.	12 24	13 19	74. 69.	.22	.09	3.78	5.05
APR	71.	78.	58.	25 2	12 19	77. 69.	.21	.09	3.66	4.87
MAY	74.	78.	69.	31 11	12 5	80. 39.	.23	.09	3.78	5.09
JUN	76.	78.	70.	29 17	12 5	87. 56.	.21	.09	3.66	4.87
JUL	76.	78.	71.	5 24	12 5	85. 65.	.22	.09	3.78	5.05
AUG	76.	78.	70.	30 26	12 5	86. 57.	.23	.09	3.78	5.09
SEP	74.	81.	69.	25 16	12 17	63. 69.	.20	.08	3.66	4.83
OCT	71.	78.	66.	4 14	12 20	83. 69.	.23	.09	3.78	5.09
NOV	70.	77.	57.	8 7	13 18	77. 69.	.22	.09	3.66	4.92
DEC	68.	74.	66.	23 18	13 7	71. -1.	.21	.09	3.78	5.01
YEAR							2.59	1.06	44.48	59.55

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD WOO

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	739	0	0	0	-.4598E+06	.0000
FEB	662	2	0	0	-.3972E+06	.0000
MAR	675	45	0	0	-.3816E+06	.1142E+06
APR	489	159	0	0	-.2270E+06	.1501E+06
MAY	224	398	0	0	-.1274E+06	.2020E+06
JUN	21	634	0	0	-.1884E+05	.2790E+06
JUL	0	714	0	0	.0000	.2936E+06
AUG	14	703	0	0	-.2885E+05	.2743E+06
SEP	205	457	0	0	-.1200E+06	.3154E+06
OCT	518	154	0	0	-.2065E+06	.2127E+06
NOV	654	36	0	0	-.3162E+06	.1210E+06
DEC	741	0	2	0	-.4750E+06	.0000
YEAR	4942	3302	2	0	-.4750E+06	.3154E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	228.15	.00	.23	.09	1.11	5.09	1.9
FEB	187.24	.00	.20	.08	1.00	4.57	1.9
MAR	155.22	.14	.22	.09	1.11	5.05	11.6
APR	82.31	.90	.21	.09	1.07	4.87	13.7
MAY	27.83	2.61	.23	.09	1.11	5.09	17.9
JUN	2.38	6.54	.21	.09	1.07	4.87	24.3
JUL	.00	9.05	.22	.09	1.11	5.05	25.4
AUG	1.58	8.25	.23	.09	1.11	5.09	23.6
SEP	26.50	4.79	.20	.08	1.07	4.83	26.6
OCT	82.14	.92	.23	.09	1.11	5.09	18.7
NOV	136.48	.15	.22	.09	1.07	4.92	12.0
DEC	227.90	.00	.21	.09	1.11	5.01	1.9
YEAR	1157.73	33.36	2.59	1.06	13.03	59.55	26.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 285336. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL SANCTUARY AREA - ZONE 1 OUTSIDE AIR (DAYTIME) (FT LEONARD  
WOO

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1042.	675.	1.000	35.	0.	0.	0 0	.0000	-.4598E+06
FEB	1450.	919.	1.000	37.	0.	0.	0 0	.0000	-.3972E+06
MAR	1886.	1231.	1.000	43.	0.	0.	0 0	.1142E+06	-.3816E+06
APR	2254.	1560.	1.000	55.	0.	0.	0 0	.1501E+06	-.2270E+06
MAY	2493.	1774.	1.000	65.	0.	0.	0 0	.2020E+06	-.1274E+06
JUN	2566.	1934.	1.000	72.	0.	0.	0 0	.2790E+06	-.1884E+05
JUL	2473.	1957.	1.000	77.	0.	0.	0 0	.2936E+06	.0000
AUG	2222.	1793.	1.000	76.	0.	0.	0 0	.2743E+06	-.2885E+05
SEP	1821.	1346.	1.000	68.	0.	0.	0 0	.3154E+06	-.1200E+06
OCT	1423.	943.	1.000	57.	0.	0.	0 0	.2127E+06	-.2065E+06
NOV	1039.	731.	1.000	47.	0.	0.	0 0	.1210E+06	-.3162E+06
DEC	888.	608.	1.000	35.	0.	0.	0 2	.0000	-.4750E+06

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 63722  
BLDG. TYPE: CHURCH (OFFICE AREA)

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	80.1	63.5	57.8			
COOLING (kWH)	13000	6640	6100			

SUPPLY AIR FAN	4785 CFM
FLOOR AREA	3189 FT <sup>2</sup>
CFM/F	215 CFM
UA	1265 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1700	50 HR	HR. ON HEATING	1300 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING	871 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	3068 HR/YR
	TOTAL OCCUPY HR.		50 HR/WK	HR. OFF COOLING	2057 HR/YR
	TOTAL UNOCC. HR.		118 HR/WK		
	ANNUAL OCCUPY HR.		2607 HR/YR		
	ANNUAL UNOCC. HR.		6153 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 1300 = 3068 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 871 = 2057 HR/YR

HOAUHC	80.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	215 CFM *	6153 HR/YR		
HOAUH	80.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	215 CFM *	3068 HR/YR		
COAUHC	13000 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	215 CFM *	6153 HR/YR		
COAUC	13000 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	215 CFM *	2057 HR/YR		
HOAOHC	80.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	215 CFM *	2607 HR/YR		
HOAOH	80.1 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	215 CFM *	1300 HR/YR		
COAOHC	13000 kWH	0 kWH	=	0.00E+00 kWH/CFM-HR
	215 CFM *	2607 HR/YR		
COAOC	13000 kWH	0 kWH	=	0.00E+00 kWH/CFM-HR
	215 CFM *	871 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 63722  
BLDG. TYPE: CHURCH (OFFICE AREA)

**ENERGY CONSTANT CALCULATIONS**

ECC	6100 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4785 CFM *	871 HR/YR		
ECHC	6100 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4785 CFM *	2607 HR/YR		
NSUCHC	13000 KWH -	6640 KWH	=	2.16E-04 KWH/CFM-HR
	4785 CFM *	6153 HR/YR		
NSUCC	13000 KWH -	6640 KWH	=	6.46E-04 KWH/CFM-HR
	4785 CFM *	2057 HR/YR		
DDCCHC	6640 KWH -	6100 KWH	=	4.33E-05 KWH/CFM-HR
	4785 CFM *	2607 HR/YR		
DDCCC	6640 KWH -	6100 KWH	=	1.30E-04 KWH/CFM-HR
	4785 CFM *	871 HR/YR		
NSC	80.1 MBtu -	63.54 MBtu	=	1.31E+04 Btu/UA
	1265 UA			
DSC	63.54 MBtu -	57.76 MBtu	=	4.57E+03 Btu/UA
	1265 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -		294 HR/YR	
			=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			
			=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 637Z2BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 637 BLDG NAME: CHAPEL - ZONE 2

BLDG FUNCTION: OFFICE AREA

FLOOR AREA: (SQ. FT) 3,189

# FLOORS 1

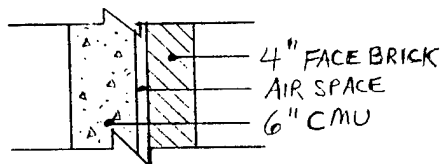
SLAB PERIMETER: (FT) 219

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	358	0	950	950	2,258
GLASS	(SQ. FT)	0	0	106	42	149
PERSONNEL DOOR	(SQ. FT)	0	0	74	0	74
INSULATED PANEL	(SQ. FT)	0	0	53	21	74
WALLS, NET	(SQ. FT)	358	0	769	908	2,035
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					3,189
INSULATED PANEL	(SQ. FT)	74				74
PERSONNEL DOOR	(SQ. FT)					74
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

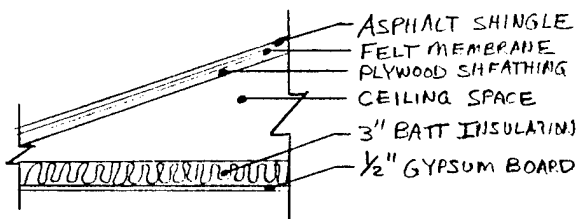
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. ASPHALT SHINGLES	0.20
3. FELT / PLYWOOD	0.76
4. CEILING AIR SPACE	1.00
5. 3" BATT INSULATION	11.00
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.26
U=1/R	0.070

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	L	2258	X CFM / SQ.FT.	0.092	= 208
LEAKY WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR		X CFM / OPENING /HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	5	X CFM / OPENING /HR	1.385	=	7
TOTAL INFILTRATION (CFM)				=	215

UA PANEL	= PANEL AREA	74	X PANEL 'U'	0.238	=	18
UA PDOOR	= PDOOR AREA	74	X DOOR 'U'	0.391	=	29
UA WALL	= WALL AREA	2,035	X WALL 'U'	0.245	=	498
UA ROOF	= ROOF AREA	3,189	X ROOF 'U'	0.070	=	224
UA GLASS	= GLASS AREA	149	X GLASS 'U'	0.621	=	92
UA SLAB	= SLAB PERIM.	219	X SLF	0.830	=	182
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	215	X A. T. F.	1.035	=	222

**TOTAL UA (BTU/HR°F) 1,265**



## EMC NO.: 3204-000

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41 -92 -C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

DATE:

**PREPARED BY:**

**CHECKED BY:**

FILE:

BLDG:

**ZONE: 2**

Rates of Heat Gain from Occupants of Conditioned Spaces							
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat. (BTU/H)
2	5	2	Seated very light work (writing)	Offices, hotels, apts	245	155	1,225
TOTAL	5					TOTAL	1,225
							775

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
2	35	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	2,940
	15	18	Incandescent - 60w	60	900
TOTAL	50			TOTAL	3,840

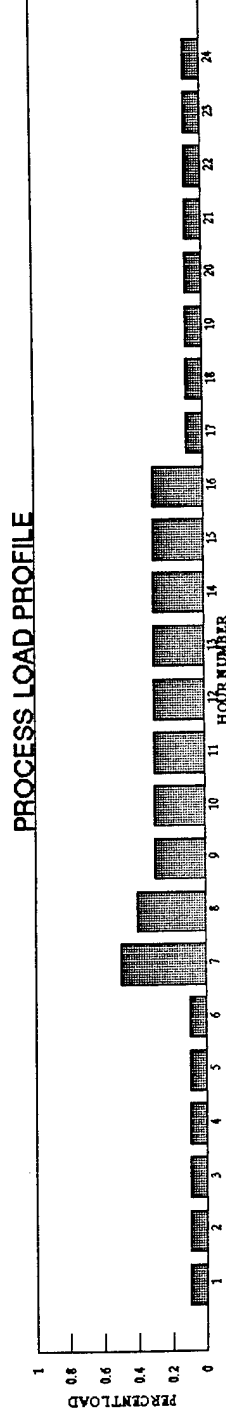
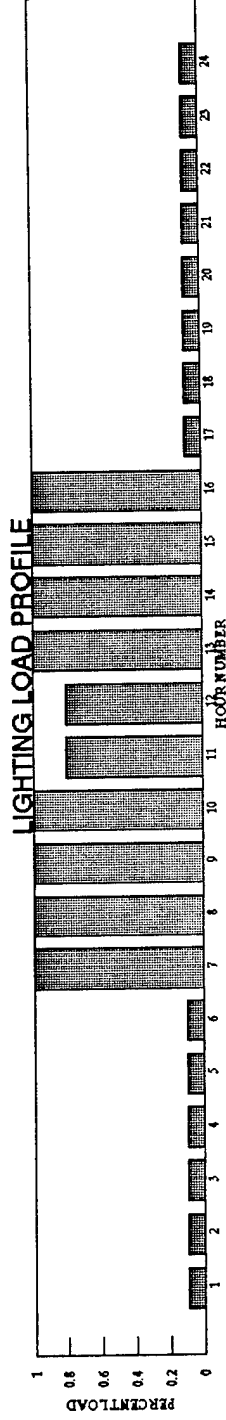
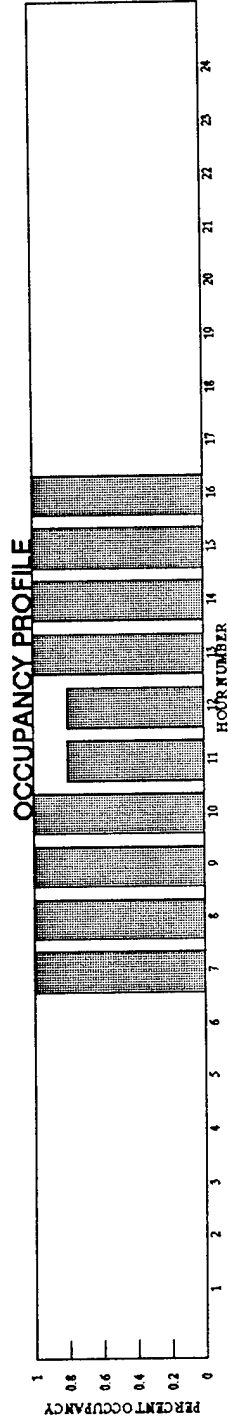
Peak Value for Internal Gains						
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage
2	1	55	Refrigerator/Freezer	326	20%	326
	1	62	Television (Color, tube)	300	15%	300
	1	24	Coffee Maker	1,500	30%	1,500
	1	46	Microwave Oven	600	65%	600
	1	51	Range with Oven	10,262	80%	10,262
			TOTAL		71%	12,988
						44,328

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 05-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 637Z2  
 BLDG: 637  
 ZONE: 2

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
8	Church Office	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.8	1	1	1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1



BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 BASERUN (FT LEONARD WOOD)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 7.500000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

## FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 29753.000000  
 FLOOR AREA (SQFT) 3189.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 120000.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -180000.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 31890.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 215.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 4.340000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 13970.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 182.000000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 29.000000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	929.0	358.0	822.0
WINDOW AREA SQFT (AWND)	.0	42.3	.0	106.0
WINDOW HEIGHT FT (WNDH)	.0	10.0	.0	10.0
WINDOW WIDTH FT (WNDW)	.0	4.2	.0	10.6
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3189.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	9.445784E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.843E-04 .287E-02 .531E-02 .118E-02 .000			843.	
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.09 .227 -.690E-02 .000			999.	
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		7.100000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
KW - - - - - BTU/HR - - - - -						
PEOPLE PEOPLE						
LIGHTS PROCESS SENSIBLE LATENT					HEATING COOLING	
PEAK VAL	4.	31473.	1225.	775.		
HOUR	- - - -	HOURLY FRACTION	OF PEAK	- - - -		
1	.100	.100	.000	.000	70.0	75.0
2	.100	.100	.000	.000	70.0	75.0
3	.100	.100	.000	.000	70.0	75.0
4	.100	.100	.000	.000	70.0	75.0
5	.100	.100	.000	.000	70.0	75.0
6	.100	.100	.000	.000	70.0	75.0
7	.200	.500	.100	.100	70.0	75.0
8	1.000	.400	.100	.100	70.0	75.0
9	1.000	.300	.100	.100	70.0	75.0
10	1.000	.300	.100	.100	70.0	75.0
11	1.000	.300	.100	.100	70.0	75.0
12	1.000	.300	.100	.100	70.0	75.0

13	1.000	.300	.100	.100	70.0	75.0
14	1.000	.300	.100	.100	70.0	75.0
15	1.000	.300	1.000	1.000	70.0	75.0
16	1.000	.300	1.000	1.000	70.0	75.0
17	1.000	.100	.100	.100	70.0	75.0
18	1.000	.100	.100	.100	70.0	75.0
19	1.000	.100	.100	.100	70.0	75.0
20	.200	.100	.100	.100	70.0	75.0
21	.100	.100	.000	.000	70.0	75.0
22	.100	.100	.000	.000	70.0	75.0
23	.100	.100	.000	.000	70.0	75.0
24	.100	.100	.000	.000	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					4785.000000	
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					120000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					150000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.420	.100	.560	.200	.650	.300	.710 .400
.740	.500	.750	.600	.760	.700	.780 .800
.790	.900	.800	1.00			
CHILLER TYPE (ITYPCH)					3	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					180000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					46075.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 BASERUN (FT LEONARD WOOD)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD		SOLAR THRU WINDOW	PARTITN		BSMT	WALL	WINDOW	VENT AND INFL	LATENT
			ROOF	DOOR AND SLAB					
JAN	.12 GAIN	2.09	.00	.00	.00	.00	.00	.00	.04
	-33.78 LOSS		-6.49	-5.57	.00	-11.06	-2.06	-22.18	.00
FEB	.08 GAIN	2.68	.00	.00	.00	.02	.00	.00	.05
	-25.75 LOSS		-5.36	-4.71	.00	-8.18	-1.75	-18.81	.00
MAR	1.17 GAIN	3.32	.01	.00	.00	.47	.00	.00	.11
	-19.83 LOSS		-4.79	-4.39	.00	-6.46	-1.62	-16.80	.00
APR	5.84 GAIN	3.54	.12	.03	.00	1.69	.01	.11	.56
	-7.35 LOSS		-2.76	-2.59	.00	-3.06	-.96	-9.22	.00
MAY	13.37 GAIN	3.88	.38	.11	.00	3.25	.04	.30	2.09
	-1.17 LOSS		-1.56	-1.52	.00	-1.23	-.54	-4.57	.00
JUN	26.22 GAIN	3.89	.75	.31	.00	4.91	.11	.88	8.06
	-.01 LOSS		-.71	-.67	.00	-.30	-.24	-1.87	.00
JUL	34.77 GAIN	4.01	1.26	.72	.00	6.46	.27	2.20	10.61
	.00 LOSS		-.45	-.40	.00	-.14	-.14	-1.12	.00
AUG	31.73 GAIN	3.52	.97	.56	.00	5.39	.20	1.58	10.39
	-.02 LOSS		-.49	-.44	.00	-.17	-.16	-1.22	.00
SEP	18.76 GAIN	3.01	.40	.28	.00	2.94	.11	.91	6.20
	-1.66 LOSS		-1.35	-1.17	.00	-1.15	-.43	-3.74	.00
OCT	4.80 GAIN	2.50	.05	.04	.00	.76	.02	.13	.98
	-6.58 LOSS		-2.99	-2.46	.00	-3.52	-.89	-7.98	.00
NOV	1.17 GAIN	1.95	.00	.00	.00	.13	.00	.00	.20
	-15.99 LOSS		-4.32	-3.59	.00	-6.50	-1.30	-12.57	.00
DEC	.00 GAIN	1.78	.00	.00	.00	.00	.00	.00	.00
	-33.01 LOSS		-6.46	-5.45	.00	-11.20	-1.99	-21.09	.00
TOT	138. GAIN	36.	4.	2.	0.	26.	1.	6.	39.
	-145. LOSS		-38.	-33.	0.	-53.	-12.	-121.	0.

MAX HEATING LOAD= -120000. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 100509. BTUH ON JUL 27 HOUR 15 AMBIENT TEMP 92.

ZONE UA BTU/HR-F

860.9

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 BASERUN (FT LEONARD WOOD)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	75.	69.	4 27	16 6	63. 4.	1.49	6.04	2.07	11.57
FEB	70.	75.	69.	9 2	16 6	61. 14.	1.34	5.42	1.87	10.39
MAR	71.	77.	69.	25 4	17 6	56. 15.	1.48	5.99	2.07	11.49
APR	72.	79.	69.	3 9	18 6	56. 30.	1.43	5.78	2.01	11.09
MAY	74.	81.	69.	10 11	17 6	53. 39.	1.49	6.04	2.07	11.57
JUN	75.	76.	70.	29 17	16 6	87. 57.	1.43	5.78	2.01	11.09
JUL	76.	76.	72.	26 10	16 6	94. 60.	1.48	5.99	2.07	11.49
AUG	75.	76.	70.	29 25	16 6	95. 51.	1.49	6.04	2.07	11.57
SEP	74.	77.	69.	24 15	19 6	59. 39.	1.42	5.73	2.01	11.01
OCT	72.	78.	69.	24 28	15 6	59. 33.	1.49	6.04	2.07	11.57
NOV	71.	76.	69.	9 3	15 6	51. 18.	1.44	5.83	2.01	11.18
DEC	70.	75.	67.	23 18	17 6	62. 0.	1.47	5.94	2.07	11.41
YEAR							17.44	70.63	24.43	135.44

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 BASERUN (FT LEONARD WOOD)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	690	9	1	0	-.1200E+06	.1949E+05
FEB	587	8	0	0	-.9855E+05	.1468E+05
MAR	538	54	0	0	-.9947E+05	.4209E+05
APR	296	201	0	0	-.6134E+05	.5730E+05
MAY	68	393	0	0	-.4175E+05	.7130E+05
JUN	1	577	0	0	-5139.	.9171E+05
JUL	0	674	0	0	.0000	.1005E+06
AUG	4	664	0	0	-.1261E+05	.8897E+05
SEP	86	443	0	0	-.3943E+05	.9244E+05
OCT	299	179	0	0	-.5635E+05	.6208E+05
NOV	491	60	0	0	-.8459E+05	.4153E+05
DEC	710	0	7	0	-.1200E+06	.0000
YEAR	3770	3262	8	0	-.1200E+06	.1005E+06



## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	18.77	.02	1.49	6.04	.61	11.57	7.0
FEB	14.13	.01	1.34	5.42	.55	10.39	6.5
MAR	10.94	.14	1.48	5.99	.61	11.49	9.2
APR	4.54	.65	1.43	5.78	.59	11.09	10.5
MAY	1.02	1.46	1.49	6.04	.61	11.57	11.6
JUN	.02	2.73	1.43	5.78	.59	11.09	13.0
JUL	.00	3.54	1.48	5.99	.61	11.49	13.6
AUG	.06	3.29	1.49	6.04	.61	11.57	12.9
SEP	1.29	1.98	1.42	5.73	.59	11.01	12.6
OCT	4.50	.54	1.49	6.04	.61	11.57	10.9
NOV	8.30	.14	1.44	5.83	.59	11.18	9.2
DEC	18.95	.00	1.47	5.94	.61	11.41	4.7
YEAR	82.51	14.50	17.44	70.63	7.16	135.44	13.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR

89866. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 BASERUN (FT LEONARD WOOD)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1074.	696.	1.000	35.	0.	0.	0 1	.1949E+05	-.1200E+06
FEB	1494.	948.	1.000	37.	0.	0.	0 0	.1468E+05	-.9855E+05
MAR	1944.	1269.	1.000	43.	0.	0.	0 0	.4209E+05	-.9947E+05
APR	2323.	1608.	1.000	55.	0.	0.	0 0	.5730E+05	-.6134E+05
MAY	2570.	1829.	1.000	65.	0.	0.	0 0	.7130E+05	-.4175E+05
JUN	2646.	1993.	1.000	72.	0.	0.	0 0	.9171E+05	-5139.
JUL	2549.	2018.	1.000	77.	0.	0.	0 0	.1005E+06	.0000
AUG	2291.	1849.	1.000	76.	0.	0.	0 0	.8897E+05	-.1261E+05
SEP	1878.	1388.	1.000	68.	0.	0.	0 0	.9244E+05	-.3943E+05
OCT	1467.	972.	1.000	57.	0.	0.	0 0	.6208E+05	-.5635E+05
NOV	1071.	754.	1.000	47.	0.	0.	0 0	.4153E+05	-.8459E+05
DEC	916.	627.	1.000	35.	0.	0.	0 7	.0000	-.1200E+06

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 7.500000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 29753.000000

FLOOR AREA (SQFT) 3189.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 120000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -180000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 31890.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 215.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 4.340000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 13970.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 182.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 29.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	929.0	358.0	822.0
WINDOW AREA SQFT (AWND)	.0	42.3	.0	106.0
WINDOW HEIGHT FT (WNDH)	.0	10.0	.0	10.0
WINDOW WIDTH FT (WNDW)	.0	4.2	.0	10.6
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3189.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	9.445784E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.843E-04 .287E-02 .531E-02 .118E-02 .000			843.	
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.09 .227 -.690E-02 .000			999.	
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		7.100000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0	90.0	90.0	90.0	90.0
90.0	90.0	90.0	90.0	90.0
90.0	90.0	90.0	90.0	90.0
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0
55.0	55.0	55.0	55.0	55.0
55.0	55.0	55.0	55.0	55.0

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	- - - - -	BTU/HR	- - - - -	
		PEOPLE	PEOPLE	
LIGHTS	PROCESS	SENSIBLE	LATENT	
				HEATING COOLING

PEAK VAL	4.	31473.	1225.	775.			
HOURLY FRACTION OF PEAK							
1	.100	.100	.000	.000	55.0	90.0	
2	.100	.100	.000	.000	55.0	90.0	
3	.100	.100	.000	.000	55.0	90.0	
4	.100	.100	.000	.000	55.0	90.0	
5	.100	.100	.000	.000	55.0	90.0	
6	.100	.100	.000	.000	55.0	90.0	
7	.200	.500	.100	.100	55.0	90.0	
8	1.000	.400	.100	.100	70.0	75.0	
9	1.000	.300	.100	.100	70.0	75.0	
10	1.000	.300	.100	.100	70.0	75.0	
11	1.000	.300	.100	.100	70.0	75.0	
12	1.000	.300	.100	.100	70.0	75.0	
13	1.000	.300	.100	.100	70.0	75.0	
14	1.000	.300	.100	.100	70.0	75.0	
15	1.000	.300	1.000	1.000	70.0	75.0	
16	1.000	.300	1.000	1.000	70.0	75.0	
17	1.000	.100	.100	.100	55.0	90.0	
18	1.000	.100	.100	.100	55.0	90.0	
19	1.000	.100	.100	.100	55.0	90.0	
20	.200	.100	.100	.100	55.0	90.0	
21	.100	.100	.000	.000	55.0	90.0	
22	.100	.100	.000	.000	55.0	90.0	
23	.100	.100	.000	.000	55.0	90.0	
24	.100	.100	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					4785.000000		
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					120000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					150000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.420	.100	.560	.200	.650	.300	.710	.400
.740	.500	.750	.600	.760	.700	.780	.800
.790	.900	.800	1.00				
CHILLER TYPE (ITYPCH)					3		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					180000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					46075.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.09	GAIN	2.09	.00	.00	.00	.00	.00	.00	.02
	-20.45	LOSS		-5.02	-4.17	.00	-7.66	-1.54	-15.79	.00
FEB	.06	GAIN	2.68	.00	.00	.00	.13	.00	.00	.03
	-14.86	LOSS		-4.14	-3.56	.00	-5.46	-1.32	-13.53	.00
MAR	.54	GAIN	3.32	.01	.00	.00	.62	.00	.01	.01
	-10.84	LOSS		-3.85	-3.48	.00	-4.43	-1.29	-12.80	.00
APR	3.01	GAIN	3.54	.10	.03	.00	1.63	.01	.10	.27
	-2.90	LOSS		-2.46	-2.35	.00	-2.35	-.87	-8.21	.00
MAY	6.86	GAIN	3.88	.23	.07	.00	2.45	.03	.20	1.00
	-.38	LOSS		-2.02	-2.06	.00	-1.84	-.74	-6.25	.00
JUN	13.90	GAIN	3.89	.43	.20	.00	3.36	.07	.58	3.83
	.00	LOSS		-1.47	-1.59	.00	-1.23	-.57	-4.67	.00
JUL	19.02	GAIN	4.01	.70	.42	.00	4.13	.15	1.26	5.09
	.00	LOSS		-1.26	-1.38	.00	-.97	-.50	-4.12	.00
AUG	16.76	GAIN	3.52	.53	.34	.00	3.44	.13	.99	4.39
	.00	LOSS		-1.29	-1.38	.00	-1.07	-.49	-4.00	.00
SEP	9.59	GAIN	3.01	.19	.15	.00	1.97	.05	.45	2.87
	-.39	LOSS		-1.77	-1.62	.00	-1.62	-.59	-5.16	.00
OCT	2.60	GAIN	2.50	.05	.05	.00	.76	.02	.16	.40
	-2.70	LOSS		-2.72	-2.21	.00	-2.90	-.80	-7.00	.00
NOV	.82	GAIN	1.95	.00	.00	.00	.16	.00	.00	.15
	-8.26	LOSS		-3.45	-2.76	.00	-4.53	-1.00	-9.26	.00
DEC	.00	GAIN	1.78	.00	.01	.00	.07	.00	.02	.00
	-19.54	LOSS		-4.91	-4.00	.00	-7.68	-1.46	-14.78	.00
TOT	73.24	GAIN	36.17	2.23	1.28	.00	18.70	.47	3.79	18.04
	-80.33	LOSS		-34.35	-30.57	.00	-41.74	-11.18	-105.57	.00

MAX HEATING LOAD= -120000. BTUH ON DEC 31 HOUR 8 AMBIENT TEMP 38.  
 MAX COOLING LOAD= 168600. BTUH ON JUL 16 HOUR 8 AMBIENT TEMP 82.

ZONE UA BTU/HR-F

860.9

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	61.	76.	54.	4 27	18 6	61. 4.	1.49	6.04	2.07	11.57
FEB	62.	77.	54.	13 2	19 6	60. 14.	1.34	5.42	1.87	10.39
MAR	65.	82.	54.	28 4	20 6	64. 15.	1.48	5.99	2.07	11.49
APR	71.	90.	55.	7 9	18 6	71. 30.	1.43	5.78	2.01	11.09
MAY	78.	91.	55.	26 9	16 6	80. 44.	1.49	6.04	2.07	11.57
JUN	82.	91.	73.	2 17	16 6	83. 57.	1.43	5.78	2.01	11.09
JUL	84.	91.	73.	28 24	15 6	93. 66.	1.48	5.99	2.07	11.49
AUG	83.	91.	71.	12 25	14 7	90. 55.	1.49	6.04	2.07	11.57
SEP	78.	91.	57.	2 15	16 7	91. 44.	1.42	5.73	2.01	11.01
OCT	71.	84.	55.	14 28	20 6	69. 33.	1.49	6.04	2.07	11.57
NOV	66.	80.	54.	8 3	20 6	67. 18.	1.44	5.83	2.01	11.18
DEC	60.	74.	54.	12 18	16 6	59. 0.	1.47	5.94	2.07	11.41
YEAR							17.44	70.63	24.43	135.44

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	519	6	25	0	-.1200E+06	.2026E+05
FEB	389	5	23	0	-.1200E+06	.2056E+05
MAR	303	20	18	0	-.1200E+06	.4294E+05
APR	103	82	6	0	-.1200E+06	.5633E+05
MAY	9	174	0	0	-.1146E+06	.9014E+05
JUN	0	244	0	0	.0000	.1509E+06
JUL	0	313	0	0	.0000	.1686E+06
AUG	0	271	0	0	.0000	.1615E+06
SEP	13	191	0	0	-.9577E+05	.1476E+06
OCT	88	72	8	0	-.1200E+06	.6491E+05
NOV	259	34	14	0	-.1200E+06	.4096E+05
DEC	482	0	29	0	-.1200E+06	.0000
YEAR	2165	1412	123	0	-.1200E+06	.1686E+06



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	14.49	.01	1.49	6.04	.61	11.57	7.1	
FEB	11.38	.01	1.34	5.42	.55	10.39	7.1	
MAR	8.90	.06	1.48	5.99	.61	11.49	9.3	
APR	3.02	.33	1.43	5.78	.59	11.09	10.4	
MAY	.46	.74	1.49	6.04	.61	11.57	12.9	
JUN	.00	1.39	1.43	5.78	.59	11.09	16.6	
JUL	.00	1.87	1.48	5.99	.61	11.49	17.6	
AUG	.00	1.65	1.49	6.04	.61	11.57	17.2	
SEP	.36	.98	1.42	5.73	.59	11.01	16.4	
OCT	2.99	.28	1.49	6.04	.61	11.57	11.1	
NOV	7.37	.10	1.44	5.83	.59	11.18	9.1	
DEC	15.39	.00	1.47	5.94	.61	11.41	4.7	
YEAR	64.36	7.43	17.44	70.63	7.16	135.44	17.6	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 76608. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 NIGHT SETBACK (FT LEONARD WOOD)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1074.	696.	1.000	35.	0.	0.	0 25	.2026E+05	-.1200E+06
FEB	1494.	948.	1.000	37.	0.	0.	0 23	.2056E+05	-.1200E+06
MAR	1944.	1269.	1.000	43.	0.	0.	0 18	.4294E+05	-.1200E+06
APR	2323.	1608.	1.000	55.	0.	0.	0 6	.5633E+05	-.1200E+06
MAY	2570.	1829.	1.000	65.	0.	0.	0 0	.9014E+05	-.1146E+06
JUN	2646.	1993.	1.000	72.	0.	0.	0 0	.1509E+06	.0000
JUL	2549.	2018.	1.000	77.	0.	0.	0 0	.1686E+06	.0000
AUG	2291.	1849.	1.000	76.	0.	0.	0 0	.1615E+06	.0000
SEP	1878.	1388.	1.000	68.	0.	0.	0 0	.1476E+06	-.9577E+05
OCT	1467.	972.	1.000	57.	0.	0.	0 8	.6491E+05	-.1200E+06
NOV	1071.	754.	1.000	47.	0.	0.	0 14	.4096E+05	-.1200E+06
DEC	916.	627.	1.000	35.	0.	0.	0 29	.0000	-.1200E+06

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 DDC (FT LEONARD WOOD)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 7.500000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.000000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 29753.000000

FLOOR AREA (SQFT) 3189.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 120000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -180000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 31890.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 215.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 4.340000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 13970.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 182.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 29.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	.0	929.0	358.0	822.0
WINDOW AREA SQFT (AWND)	.0	42.3	.0	106.0
WINDOW HEIGHT FT (WNDH)	.0	10.0	.0	10.0
WINDOW WIDTH FT (WNDW)	.0	4.2	.0	10.6
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	3189.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.000000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	9.445784E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.843E-04 .287E-02 .531E-02 .118E-02 .000		843.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.09 .227 -.690E-02 .000	999.			
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	7.100000E-01			
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

				THERMOSTAT SET	
				POINT DEG F	
KW	BTU/HR				
	PEOPLE				
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	4.	31473.	1225.	775.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.100	.000	.000	55.0	90.0
2	.100	.100	.000	.000	55.0	90.0
3	.100	.100	.000	.000	55.0	90.0
4	.100	.100	.000	.000	55.0	90.0
5	.100	.100	.000	.000	55.0	90.0
6	.100	.100	.000	.000	55.0	90.0
7	.200	.500	.100	.100	55.0	90.0
8	1.000	.400	.100	.100	68.0	78.0
9	1.000	.300	.100	.100	68.0	78.0
10	1.000	.300	.100	.100	68.0	78.0
11	1.000	.300	.100	.100	68.0	78.0
12	1.000	.300	.100	.100	68.0	78.0
13	1.000	.300	.100	.100	68.0	78.0
14	1.000	.300	.100	.100	68.0	78.0
15	1.000	.300	1.000	1.000	68.0	78.0
16	1.000	.300	1.000	1.000	68.0	78.0
17	1.000	.100	.100	.100	55.0	90.0
18	1.000	.100	.100	.100	55.0	90.0
19	1.000	.100	.100	.100	55.0	90.0
20	.200	.100	.100	.100	55.0	90.0
21	.100	.100	.000	.000	55.0	90.0
22	.100	.100	.000	.000	55.0	90.0
23	.100	.100	.000	.000	55.0	90.0
24	.100	.100	.000	.000	55.0	90.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)				68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)				60.000000		
SYSTEM TYPE, (IECN)				2		
SUPPLY AIR CFM (SACFM)				4785.000000		
ECONOMIZER HIGH TEMP LIMIT F				0.000000E+00		
SYSTEM SUPPLY AIR START TIME HR				0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR				24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)				55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)				0.000000E+00		
FAN EFFICIENCY (EFAN)				5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)				8.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)				120000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)				150000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.420	.100	.560	.200	.650	.300	.710 .400
.740	.500	.750	.600	.760	.700	.780 .800
.790	.900	.800	1.00			
CHILLER TYPE (ITYPCH)				3		
COOLING PLANT RATED OUTPUT BTU (CFLOT)				180000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)				46075.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 DDC (FT LEONARD WOOD)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	2.09	.00	.00	.00	.00	.00	.00	.00
	-19.53	LOSS		-4.92	-4.08	.00	-7.44	-1.51	-15.39	.00
FEB	.00	GAIN	2.68	.00	.00	.00	.14	.00	.00	.00
	-14.10	LOSS		-4.05	-3.48	.00	-5.28	-1.29	-13.19	.00
MAR	.26	GAIN	3.32	.01	.00	.00	.62	.00	.01	.00
	-10.07	LOSS		-3.79	-3.43	.00	-4.30	-1.27	-12.56	.00
APR	2.11	GAIN	3.54	.08	.02	.00	1.51	.01	.05	.24
	-2.53	LOSS		-2.50	-2.39	.00	-2.38	-.89	-8.37	.00
MAY	5.45	GAIN	3.88	.17	.03	.00	2.21	.01	.08	.93
	-.28	LOSS		-2.14	-2.18	.00	-1.99	-.78	-6.62	.00
JUN	12.57	GAIN	3.89	.34	.11	.00	3.03	.04	.32	3.93
	.00	LOSS		-1.57	-1.68	.00	-1.35	-.60	-4.96	.00
JUL	17.88	GAIN	4.01	.59	.30	.00	3.79	.11	.90	5.36
	.00	LOSS		-1.34	-1.44	.00	-1.06	-.52	-4.31	.00
AUG	15.25	GAIN	3.52	.42	.22	.00	3.07	.08	.64	4.48
	.00	LOSS		-1.40	-1.46	.00	-1.19	-.52	-4.24	.00
SEP	8.22	GAIN	3.01	.14	.10	.00	1.76	.04	.30	2.81
	-.23	LOSS		-1.88	-1.72	.00	-1.77	-.63	-5.48	.00
OCT	1.80	GAIN	2.50	.03	.04	.00	.68	.01	.11	.36
	-2.20	LOSS		-2.74	-2.23	.00	-2.91	-.81	-7.04	.00
NOV	.35	GAIN	1.95	.00	.00	.00	.14	.00	.00	.08
	-7.58	LOSS		-3.42	-2.73	.00	-4.43	-.99	-9.12	.00
DEC	.00	GAIN	1.78	.00	.01	.00	.07	.00	.02	.00
	-18.69	LOSS		-4.81	-3.91	.00	-7.46	-1.43	-14.37	.00
TOT	63.89	GAIN	36.17	1.80	.83	.00	17.03	.31	2.43	18.20
	-75.20	LOSS		-34.56	-30.73	.00	-41.56	-11.24	-105.65	.00

MAX HEATING LOAD= -120000. BTUH ON DEC 31 HOUR 8 AMBIENT TEMP 38.  
 MAX COOLING LOAD= 140225. BTUH ON JUL 16 HOUR 8 AMBIENT TEMP 82.

ZONE UA BTU/HR-F

860.9

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 DDC (FT LEONARD WOOD)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	78.	54.	4 27	18 6	61. 4.	1.49	6.04	2.07	11.57
FEB	61.	77.	54.	13 2	19 6	60. 14.	1.34	5.42	1.87	10.39
MAR	65.	84.	54.	28 4	19 6	68. 15.	1.48	5.99	2.07	11.49
APR	71.	90.	55.	7 9	18 6	71. 30.	1.43	5.78	2.01	11.09
MAY	79.	91.	55.	26 9	16 6	80. 44.	1.49	6.04	2.07	11.57
JUN	83.	91.	73.	2 17	16 6	83. 57.	1.43	5.78	2.01	11.09
JUL	85.	91.	73.	28 24	15 6	93. 66.	1.48	5.99	2.07	11.49
AUG	84.	91.	71.	12 25	14 7	90. 55.	1.49	6.04	2.07	11.57
SEP	79.	91.	57.	2 15	16 7	91. 44.	1.42	5.73	2.01	11.01
OCT	71.	85.	55.	4 28	21 6	69. 33.	1.49	6.04	2.07	11.57
NOV	65.	82.	54.	8 3	19 6	67. 18.	1.44	5.83	2.01	11.18
DEC	60.	73.	54.	12 18	16 6	59. 0.	1.47	5.94	2.07	11.41
YEAR							17.44	70.63	24.43	135.44

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 DDC (FT LEONARD WOOD)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	519	0	20	0	-.1200E+06	.0000
FEB	382	0	17	0	-.1200E+06	.0000
MAR	295	10	13	0	-.1200E+06	.3891E+05
APR	96	63	3	0	-.1200E+06	.5168E+05
MAY	8	151	0	0	-.9571E+05	.6535E+05
JUN	0	248	0	0	.0000	.1204E+06
JUL	0	327	0	0	.0000	.1402E+06
AUG	0	277	0	0	.0000	.1314E+06
SEP	8	173	0	0	-.7668E+05	.1192E+06
OCT	80	52	2	0	-.1200E+06	.5648E+05
NOV	253	14	13	0	-.1200E+06	.3646E+05
DEC	488	0	23	0	-.1200E+06	.0000
YEAR	2129	1315	91	0	-.1200E+06	.1402E+06



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	13.20	.00	1.49	6.04	.61	11.57	4.7
FEB	10.44	.00	1.34	5.42	.55	10.39	4.7
MAR	8.02	.03	1.48	5.99	.61	11.49	8.9
APR	2.74	.23	1.43	5.78	.59	11.09	10.1
MAY	.37	.60	1.49	6.04	.61	11.57	11.2
JUN	.00	1.29	1.43	5.78	.59	11.09	14.8
JUL	.00	1.80	1.48	5.99	.61	11.49	16.0
AUG	.00	1.55	1.49	6.04	.61	11.57	15.5
SEP	.16	.86	1.42	5.73	.59	11.01	14.8
OCT	2.53	.20	1.49	6.04	.61	11.57	10.5
NOV	6.68	.04	1.44	5.83	.59	11.18	8.7
DEC	14.16	.00	1.47	5.94	.61	11.41	4.7
YEAR	58.29	6.60	17.44	70.63	7.16	135.44	16.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR

73814. BTU/(SQFT-YEAR)

BLDG 637 - CHAPEL OFFICE AREA - ZONE 2 DDC (FT LEONARD WOOD)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1074.	696.	1.000	35.	0.	0.	0	20	.0000	-.1200E+06
FEB	1494.	948.	1.000	37.	0.	0.	0	17	.0000	-.1200E+06
MAR	1944.	1269.	1.000	43.	0.	0.	0	13	.3891E+05	-.1200E+06
APR	2323.	1608.	1.000	55.	0.	0.	0	3	.5168E+05	-.1200E+06
MAY	2570.	1829.	1.000	65.	0.	0.	0	0	.6535E+05	-.9571E+05
JUN	2646.	1993.	1.000	72.	0.	0.	0	0	.1204E+06	.0000
JUL	2549.	2018.	1.000	77.	0.	0.	0	0	.1402E+06	.0000
AUG	2291.	1849.	1.000	76.	0.	0.	0	0	.1314E+06	.0000
SEP	1878.	1388.	1.000	68.	0.	0.	0	0	.1192E+06	-.7668E+05
OCT	1467.	972.	1.000	57.	0.	0.	0	2	.5648E+05	-.1200E+06
NOV	1071.	754.	1.000	47.	0.	0.	0	13	.3646E+05	-.1200E+06
DEC	916.	627.	1.000	35.	0.	0.	0	23	.0000	-.1200E+06

**COMPUTER SIMULATIONS**

**BUILDING 639**

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 639Z1  
BLDG. TYPE: PX (STORE)

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	538.3	320.2	316.7	316.7	503.3	527.3
COOLING (kWH)	16700	8900	8700	8580	16360	15900

SUPPLY AIR FAN	6000 CFM
FLOOR AREA	3706 FT <sup>2</sup>
CFMI	358 CFM
UA	1712 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	1700	2000	15 HR	HR. ON HEATING	650 HR/YR
SAT.	1700	2000	3 HR	HR. ON COOLING	436 HR/YR
SUN.	1300	2000	7 HR	HR. OFF HEATING	3718 HR/YR
	TOTAL OCCUPY HR.		25 HR/WK	HR. OFF COOLING	2492 HR/YR
	TOTAL UNOCC. HR.		143 HR/WK		
	ANNUAL OCCUPY HR.		1304 HR/YR		
	ANNUAL UNOCC. HR.		7456 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 650 = 3718 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 436 = 2492 HR/YR

HOAUHC	538.3 MBtu -	503.3 MBtu	=	1.31E+01 Btu/CFM-HR
	358 CFM *	7456 HR/YR		
HOAUH	538.3 MBtu -	503.3 MBtu	=	2.63E+01 Btu/CFM-HR
	358 CFM *	3718 HR/YR		
COAUHC	16700 kWH -	16360 kWH	=	1.27E-04 kWH/CFM-HR
	358 CFM *	7456 HR/YR		
COAUC	16700 kWH -	16360 kWH	=	3.81E-04 kWH/CFM-HR
	358 CFM *	2492 HR/YR		
HOAOHC	538.3 MBtu -	527.3 MBtu	=	2.36E+01 Btu/CFM-HR
	358 CFM *	1304 HR/YR		
HOAOH	538.3 MBtu -	527.3 MBtu	=	4.73E+01 Btu/CFM-HR
	358 CFM *	650 HR/YR		
COAOHC	16700 kWH -	15900 kWH	=	1.71E-03 kWH/CFM-HR
	358 CFM *	1304 HR/YR		
COAOC	16700 kWH -	15900 kWH	=	5.13E-03 kWH/CFM-HR
	358 CFM *	436 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 639Z1  
BLDG. TYPE: PX (STORE)

**ENERGY CONSTANT CALCULATIONS**

ECC	8700 KWH -	8580 KWH	=	4.59E-05 KWH/CFM-HR
	6000 CFM *	436 HR/YR		
ECHC	8700 KWH -	8580 KWH	=	1.53E-05 KWH/CFM-HR
	6000 CFM *	1304 HR/YR		
NSUCHC	16700 KWH -	8900 KWH	=	1.74E-04 KWH/CFM-HR
	6000 CFM *	7456 HR/YR		
NSUCC	16700 KWH -	8900 KWH	=	5.22E-04 KWH/CFM-HR
	6000 CFM *	2492 HR/YR		
DDCCHC	8900 KWH -	8700 KWH	=	2.56E-05 KWH/CFM-HR
	6000 CFM *	1304 HR/YR		
DDCCC	8900 KWH -	8700 KWH	=	7.65E-05 KWH/CFM-HR
	6000 CFM *	436 HR/YR		
NSC	538.3 MBtu -	320.21 MBtu	=	1.27E+05 Btu/UA
		1712 UA		
DSC	320.21 MBtu -	316.72 MBtu	=	2.04E+03 Btu/UA
		1712 UA		
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 03-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 639ABHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 639 BLDG NAME: POST EXCHANGE - ZONE 1

BLDG FUNCTION: STORE AND SNACK BAR

FLOOR AREA: (SQ. FT) 3,706 # FLOORS 1

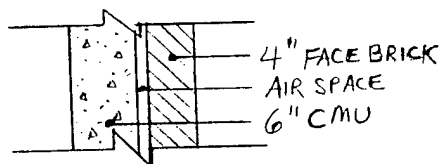
SLAB PERIMETER: (FT) 192

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	851	207	1,150	665	2,873
GLASS	(SQ. FT)	0	0	107	0	107
PERSONNEL DOOR	(SQ. FT)	0	0	49	123	172
INSULATED PANEL	(SQ. FT)	0	0	53	0	53
WALLS, NET	(SQ. FT)	851	207	941	542	2,541
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					3,706
INSULATED PANEL	(SQ. FT)	53				172
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

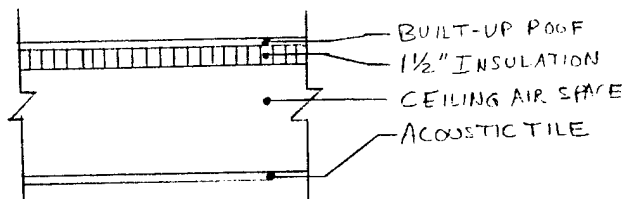
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 1.5" INSULATION	4.98
4. CEILING AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	8.95
U=1/R	0.112

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	2873	X CFM / SQ.FT.	0.115	= 330
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	20		X CFM / OPENING / HR	1.385	= 28
TOTAL INFILTRATION (CFM)					358

UA PANEL	= PANEL AREA	53	X PANEL 'U'	0.238	=	13
UA PDOOR	= PDOOR AREA	172	X DOOR 'U'	0.391	=	67
UA WALL	= WALL AREA	2,488	X WALL 'U'	0.245	=	622
UA ROOF	= ROOF AREA	3,706	X ROOF 'U'	0.112	=	414
UA GLASS	= GLASS AREA	107	X GLASS 'U'	0.621	=	66
UA SLAB	= SLAB PERIM.	192	X SLF	0.830	=	159
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	358	X A. T. F.	1.035	=	371
TOTAL UA (BTU/HR°F)						1,712

## EMC NO.: 3204-000

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

DATE:

**PREPARED BY:**

**CHECKED BY:**

FILE:

BLDG:

**ZONE:**

1

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
1	10	4	Seated, light work, typing	Offices, hotels, apts	250	200	2,500	2,000
	6	5	Standing, light work, or walking slowly	Retail store, bank	270	220	1,320	1,320
	20	3	Seated Eating	Restaurant	225	325	4,500	6,500
TOTAL	36					TOTAL	8,620	9,820

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	39	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	6,552
	3	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	252
	27	18	Incandescent - 60w	60	1,620
TOTAL	69			TOTAL	8,424

## Peak Value for Internal Gains

[illegible]

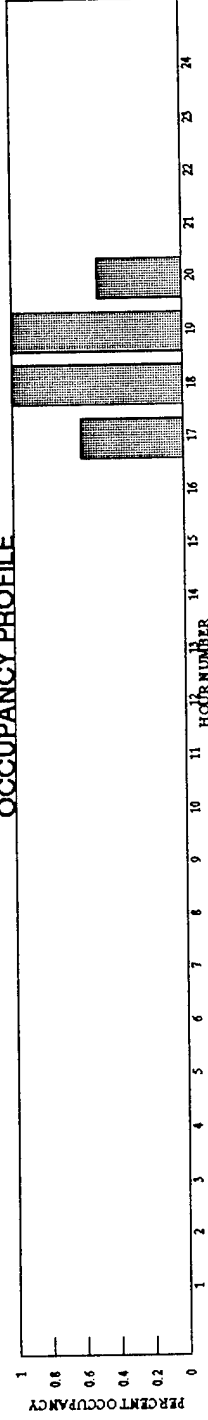
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

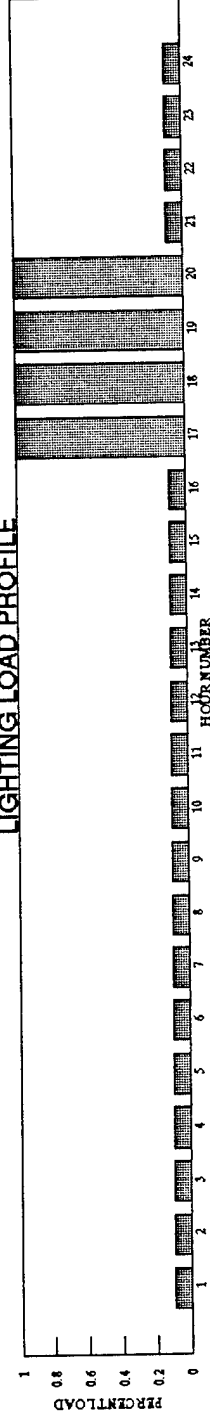
EMC NO.: 3204-000  
 DATE: 03-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 639AZ1  
 BLDG: 639A  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
4	Post Exchange	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.1	0.1	0.1	0.1
		LIGHTING																		0.6	1	1	1	1	0.1	0.1	0.1
		PROCESS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.6	0.0	0.0	0.0	0.0

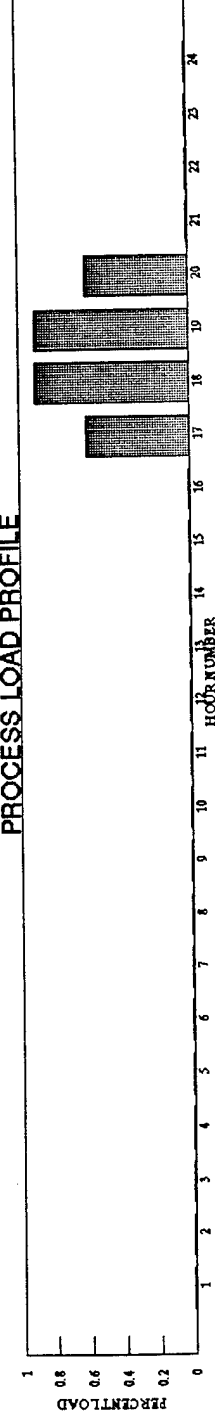
OCCUPANCY PROFILE



LIGHTING LOAD PROFILE



PROCESS LOAD PROFILE





BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 BASERUN (FT L. WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 34650.820000  
 FLOOR AREA (SQFT) 3706.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 325000.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -245500.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 37060.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 358.000000

INFILTRATION PROFILE

.930	.930	.930	.930	.930	.930	.930	.930
.930	.930	.930	.930	.930	.930	.930	.930
1.00	1.00	1.00	1.00	.930	.930	.930	.930

A FACTOR IN INFILTRATION EQUATION (CINA) 6.200000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 9170.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 158.900000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 67.000000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	207.0	542.0	851.0	994.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	107.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.7
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0

U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4011.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MND,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			6.100000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	BTU/HR		HEATING	COOLING
				SENSIBLE	LATENT		
		8.	43435.	8620.	9820.		
		HOURLY FRACTION OF PEAK					
1	.100	.012	.000	.000		70.0	76.0
2	.100	.012	.000	.000		70.0	76.0
3	.100	.012	.000	.000		70.0	76.0
4	.100	.012	.000	.000		70.0	76.0
5	.100	.012	.000	.000		70.0	76.0
6	.100	.012	.000	.000		70.0	76.0
7	.100	.012	.000	.000		70.0	76.0
8	.100	.012	.000	.000		70.0	76.0
9	.100	.012	.000	.000		70.0	76.0
10	.100	.012	.000	.000		70.0	76.0
11	.100	.012	.000	.000		70.0	76.0
12	.100	.012	.000	.000		70.0	76.0
13	.100	.012	.000	.000		70.0	76.0

14	.100	.012	.000	.000	70.0	76.0
15	.100	.012	.000	.000	70.0	76.0
16	.100	.012	.000	.000	70.0	76.0
17	1.000	.600	.600	.600	70.0	76.0
18	1.000	.900	1.000	1.000	70.0	76.0
19	1.000	.900	1.000	1.000	70.0	76.0
20	1.000	.600	.500	.500	70.0	76.0
21	.100	.012	.000	.000	70.0	76.0
22	.100	.012	.000	.000	70.0	76.0
23	.100	.012	.000	.000	70.0	76.0
24	.100	.012	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					6000.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					58.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					330000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					412500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					3	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					245500.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					64704.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 BASERUN (FT L. WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	1.31	.00	.00	.00	.01	.00	.00	.00
	-69.01	LOSS		-13.18	-5.95	.00	-13.88	-1.48	-49.34	.00
FEB	.00	GAIN	1.78	.00	.00	.00	.02	.00	.00	.00
	-55.79	LOSS		-10.90	-5.06	.00	-10.48	-1.26	-42.19	.00
MAR	1.10	GAIN	2.27	.17	.00	.00	.49	.00	.02	.19
	-47.24	LOSS		-9.86	-4.67	.00	-8.30	-1.16	-38.94	.00
APR	6.48	GAIN	2.40	.73	.04	.00	1.82	.01	.25	.96
	-22.41	LOSS		-5.88	-2.69	.00	-3.88	-.67	-22.22	.00
MAY	15.90	GAIN	2.64	1.46	.12	.00	3.71	.03	.78	3.78
	-7.39	LOSS		-3.52	-1.42	.00	-1.26	-.34	-10.95	.00
JUN	35.33	GAIN	2.76	2.21	.30	.00	5.51	.07	2.02	15.47
	-1.02	LOSS		-2.06	-.61	.00	-.21	-.15	-4.24	.00
JUL	49.29	GAIN	2.78	3.07	.71	.00	7.15	.18	4.83	21.45
	-.39	LOSS		-1.59	-.38	.00	-.09	-.09	-2.75	.00
AUG	44.47	GAIN	2.48	2.55	.54	.00	5.83	.13	3.58	20.50
	-.71	LOSS		-1.77	-.44	.00	-.14	-.11	-2.91	.00
SEP	24.34	GAIN	2.06	1.35	.29	.00	3.27	.07	2.03	10.86
	-6.64	LOSS		-3.25	-1.16	.00	-1.30	-.28	-9.65	.00
OCT	5.31	GAIN	1.65	.37	.06	.00	.87	.01	.38	1.51
	-20.90	LOSS		-6.16	-2.53	.00	-4.35	-.62	-20.31	.00
NOV	.76	GAIN	1.20	.06	.00	.00	.17	.00	.03	.18
	-37.97	LOSS		-8.76	-3.79	.00	-8.11	-.92	-30.39	.00
DEC	.00	GAIN	1.07	.00	.00	.00	.00	.00	.00	.00
	-67.83	LOSS		-13.13	-5.86	.00	-14.10	-1.44	-48.13	.00
TOT	183.	GAIN	24.	12.	2.	0.	29.	1.	14.	75.
	-337.	LOSS		-80.	-35.	0.	-66.	-9.	-282.	0.

MAX HEATING LOAD= -233058. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 241835. BTUH ON JUL 28 HOUR 18 AMBIENT TEMP 90.

ZONE UA BTU/HR-F 1218.1

BEACON Energy Analysis By Energy Systems Engineers, Inc.

639A.I

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 BASERUN (FT L. WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	77.	68.	4 27	19 7	58. 4.	1.72	7.84	1.95	13.51
FEB	70.	77.	69.	25 2	19 7	47. 14.	1.57	7.15	1.76	12.30
MAR	70.	78.	69.	10 4	19 6	63. 15.	1.74	7.93	1.95	13.64
APR	72.	78.	69.	29 9	19 6	69. 30.	1.69	7.70	1.89	13.23
MAY	73.	78.	69.	26 3	19 8	75. 66.	1.72	7.84	1.95	13.51
JUN	75.	78.	69.	30 10	19 6	82. 66.	1.69	7.70	1.89	13.23
JUL	76.	79.	69.	15 24	18 7	92. 67.	1.74	7.93	1.95	13.64
AUG	76.	78.	70.	11 25	19 6	84. 51.	1.72	7.84	1.95	13.51
SEP	74.	78.	68.	2 5	19 7	83. 66.	1.71	7.79	1.89	13.36
OCT	72.	78.	68.	14 24	19 7	71. 67.	1.72	7.84	1.95	13.51
NOV	70.	78.	67.	17 8	19 7	59. 66.	1.67	7.61	1.89	13.11
DEC	70.	78.	68.	23 18	19 7	54. -1.	1.76	8.02	1.95	13.76
YEAR							20.42	93.20	22.97	160.31

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 BASERUN (FT L. WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	705	6	0	0	-.2159E+06	.0000
FEB	612	21	0	0	-.1829E+06	.0000
MAR	614	58	0	0	-.1812E+06	.1274E+06
APR	432	143	0	0	-.1182E+06	.1378E+06
MAY	282	255	0	0	-.8522E+05	.1703E+06
JUN	74	383	0	0	-.3120E+05	.2227E+06
JUL	36	517	0	0	-.2731E+05	.2418E+06
AUG	44	477	0	0	-.4116E+05	.2261E+06
SEP	180	312	0	0	-.8061E+05	.2174E+06
OCT	438	136	0	0	-.1103E+06	.1345E+06
NOV	564	57	0	0	-.1575E+06	.8933E+05
DEC	698	18	0	0	-.2331E+06	.0000
YEAR	4679	2383	0	0	-.2331E+06	.2418E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	106.87	.00	1.72	7.84	.57	13.51	12.4
FEB	88.49	.00	1.57	7.15	.52	12.30	12.4
MAR	79.97	.12	1.74	7.93	.57	13.64	24.3
APR	45.56	.69	1.69	7.70	.55	13.23	25.0
MAY	23.78	1.64	1.72	7.84	.57	13.51	27.0
JUN	5.82	3.48	1.69	7.70	.55	13.23	30.1
JUL	2.83	4.79	1.74	7.93	.57	13.64	31.1
AUG	3.47	4.37	1.72	7.84	.57	13.51	30.2
SEP	16.30	2.42	1.71	7.79	.55	13.36	29.8
OCT	44.14	.56	1.72	7.84	.57	13.51	24.4
NOV	68.01	.08	1.67	7.61	.55	13.11	18.3
DEC	105.29	.00	1.76	8.02	.57	13.76	12.4
YEAR	590.53	18.15	20.42	93.20	6.73	160.31	31.1

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 226210. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 BASERUN (FT L. WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2159E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1829E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.1274E+06	-.1812E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1378E+06	-.1182E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.1703E+06	-.8522E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.2227E+06	-.3120E+05
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.2418E+06	-.2731E+05
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.2261E+06	-.4116E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.2174E+06	-.8061E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.1345E+06	-.1103E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.8933E+05	-.1575E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.2331E+06



BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 NIGHT SETBACK (FT L. WOOD  
 ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0  
 ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955  
 SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 34650.820000  
 FLOOR AREA (SQFT) 3706.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 325000.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -245500.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 37060.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 358.000000  
 INFILTRATION PROFILE  

.930	.930	.930	.930	.930	.930	.930	.930
.930	.930	.930	.930	.930	.930	.930	.930
1.00	1.00	1.00	1.00	.930	.930	.930	.930

A FACTOR IN INFILTRATION EQUATION (CINA) 6.200000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 9170.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 158.900000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 67.000000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 6.200000E-01

	WALL DATA			
WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	207.0	542.0	851.0	994.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	107.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.7
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0

	KW	BTU/HR				
		PEOPLE	PEOPLE			
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	43435.	8620.	9820.		

HOUR	HOURLY FRACTION OF PEAK							
1	.100	.012	.000	.000	55.0	90.0		
2	.100	.012	.000	.000	55.0	90.0		
3	.100	.012	.000	.000	55.0	90.0		
4	.100	.012	.000	.000	55.0	90.0		
5	.100	.012	.000	.000	55.0	90.0		
6	.100	.012	.000	.000	55.0	90.0		
7	.100	.012	.000	.000	55.0	90.0		
8	.100	.012	.000	.000	55.0	90.0		
9	.100	.012	.000	.000	55.0	90.0		
10	.100	.012	.000	.000	55.0	90.0		
11	.100	.012	.000	.000	55.0	90.0		
12	.100	.012	.000	.000	55.0	90.0		
13	.100	.012	.000	.000	55.0	90.0		
14	.100	.012	.000	.000	55.0	90.0		
15	.100	.012	.000	.000	55.0	90.0		
16	.100	.012	.000	.000	55.0	90.0		
17	1.000	.600	.600	.600	55.0	90.0		
18	1.000	.900	1.000	1.000	70.0	76.0		
19	1.000	.900	1.000	1.000	70.0	76.0		
20	1.000	.600	.500	.500	70.0	76.0		
21	.100	.012	.000	.000	55.0	90.0		
22	.100	.012	.000	.000	55.0	90.0		
23	.100	.012	.000	.000	55.0	90.0		
24	.100	.012	.000	.000	55.0	90.0		
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000			
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000			
SYSTEM TYPE, (IECN)					2			
SUPPLY AIR CFM (SACFM)					6000.000000			
ECONOMIZER HIGH TEMP LIMIT F					65.000000			
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00			
SYSTEM SUPPLY AIR STOP TIME HR					24.000000			
SYSTEM MIXED AIR TEMP(TMXAIR)					58.000000			
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01			
FAN EFFICIENCY (EFAN)					5.500000E-01			
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01			
HEATING PLANT RATED OUTPUT BTU (HFLOT)					330000.000000			
HEATING PLANT RATED INPUT BTU (HFLIN)					412500.000000			
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)								
.100	.191	.200	.286	.300	.369	.400 .451		
.500	.537	.600	.625	.700	.718	.800 .812		
.900	.906	1.00	1.00					
CHILLER TYPE (ITYPCH)					3			
COOLING PLANT RATED OUTPUT BTU (CFLOT)					245500.000000			
COOLING PLANT RATED INPUT BTU (CFLIN)					64704.000000			
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)								
.000	.000	.000	.000	.000	.000	.000 .000		
.000	.000	.000	.000	.000	.000	.000 .000		
.000	.000	.000	.000					

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 NIGHT SETBACK (FT L. WOOD

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	1.31	.03	.01	.00	.13	.00	.07	.00
	-39.83	LOSS		-9.27	-3.99	.00	-8.50	-.99	-32.27	.00
FEB	.00	GAIN	1.78	.08	.01	.00	.35	.00	.04	.00
	-30.20	LOSS		-7.50	-3.32	.00	-5.92	-.83	-27.19	.00
MAR	.86	GAIN	2.27	.35	.04	.00	1.22	.01	.27	.15
	-22.24	LOSS		-6.62	-2.99	.00	-4.23	-.75	-24.73	.00
APR	4.94	GAIN	2.40	.91	.09	.00	2.54	.02	.66	.53
	-6.91	LOSS		-3.99	-1.71	.00	-1.68	-.43	-14.38	.00
MAY	11.12	GAIN	2.64	1.35	.15	.00	3.81	.04	1.01	1.97
	-.66	LOSS		-2.85	-1.17	.00	-.57	-.28	-9.11	.00
JUN	20.84	GAIN	2.76	1.56	.14	.00	4.42	.04	.95	7.03
	.00	LOSS		-2.20	-.85	.00	-.23	-.21	-5.74	.00
JUL	27.45	GAIN	2.78	2.05	.26	.00	5.11	.06	1.73	9.71
	.00	LOSS		-2.07	-.69	.00	-.17	-.17	-4.82	.00
AUG	24.01	GAIN	2.48	1.71	.22	.00	4.22	.05	1.45	8.18
	.00	LOSS		-2.12	-.71	.00	-.21	-.17	-4.70	.00
SEP	13.73	GAIN	2.06	1.12	.21	.00	2.87	.05	1.47	4.63
	-.86	LOSS		-2.83	-.99	.00	-.65	-.24	-8.36	.00
OCT	3.68	GAIN	1.65	.50	.12	.00	1.39	.03	.85	.78
	-5.09	LOSS		-4.12	-1.51	.00	-1.83	-.37	-12.43	.00
NOV	.60	GAIN	1.20	.18	.06	.00	.49	.02	.45	.09
	-16.73	LOSS		-5.86	-2.34	.00	-4.21	-.57	-18.76	.00
DEC	.00	GAIN	1.07	.03	.02	.00	.07	.00	.11	.00
	-38.88	LOSS		-9.20	-3.90	.00	-8.61	-.96	-31.28	.00
TOT	107.	GAIN	24.	10.	1.	0.	27.	0.	9.	33.
	-161.	LOSS		-59.	-24.	0.	-37.	-6.	-194.	0.

MAX HEATING LOAD= -210137. BTUH ON JAN 28 HOUR 14  
 MAX COOLING LOAD= 245500. BTUH ON AUG 28 HOUR 18

AMBIENT TEMP 18.  
 AMBIENT TEMP 91.

ZONE UA BTU/HR-F 1218.1

BEACON Energy Analysis By Energy Systems Engineers, Inc.

639A-2.I

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 NIGHT SETBACK (FT L. WOOD

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	58.	77.	54.	4 27	19 7	58. 4.	1.72	7.84	1.95	13.51
FEB	59.	79.	54.	25 2	20 7	47. 14.	1.57	7.15	1.76	12.30
MAR	60.	90.	54.	28 4	17 6	75. 15.	1.74	7.93	1.95	13.64
APR	66.	91.	54.	30 9	17 6	83. 30.	1.69	7.70	1.89	13.23
MAY	72.	91.	55.	29 11	17 5	85. 39.	1.72	7.84	1.95	13.51
JUN	77.	91.	60.	29 17	17 6	86. 57.	1.69	7.70	1.89	13.23
JUL	80.	91.	62.	26 10	17 6	93. 60.	1.74	7.93	1.95	13.64
AUG	79.	91.	58.	29 25	17 7	94. 55.	1.72	7.84	1.95	13.51
SEP	73.	91.	55.	10 15	17 6	86. 39.	1.71	7.79	1.89	13.36
OCT	65.	91.	54.	4 28	17 6	79. 33.	1.72	7.84	1.95	13.51
NOV	61.	85.	54.	8 3	17 7	72. 18.	1.67	7.61	1.89	13.11
DEC	58.	81.	54.	23 18	20 7	55. -1.	1.76	8.02	1.95	13.76
YEAR							20.42	93.20	22.97	160.31

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 NIGHT SETBACK (FT L.  
WOOD

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	602	5	0	0	-.2101E+06	.0000
FEB	510	19	0	0	-.1730E+06	.0000
MAR	454	33	0	0	-.1850E+06	.1440E+06
APR	213	80	0	0	-.1234E+06	.1865E+06
MAY	32	132	0	0	-.4238E+05	.2119E+06
JUN	0	167	0	2	.0000	.2455E+06
JUL	0	224	0	11	.0000	.2455E+06
AUG	0	192	0	4	.0000	.2455E+06
SEP	50	141	0	0	-.3762E+05	.2316E+06
OCT	203	78	0	0	-.9190E+05	.2013E+06
NOV	374	45	0	0	-.1343E+06	.1286E+06
DEC	623	15	0	0	-.1781E+06	.0000
YEAR	3061	1131	0	17	-.2101E+06	.2455E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	71.62	.00	1.72	7.84	.57	13.51	12.4
FEB	57.56	.00	1.57	7.15	.52	12.30	12.4
MAR	46.65	.09	1.74	7.93	.57	13.64	24.6
APR	19.00	.48	1.69	7.70	.55	13.23	25.0
MAY	2.56	1.06	1.72	7.84	.57	13.51	27.0
JUN	.00	1.91	1.69	7.70	.55	13.23	30.0
JUL	.00	2.49	1.74	7.93	.57	13.64	30.9
AUG	.00	2.18	1.72	7.84	.57	13.51	30.1
SEP	3.94	1.26	1.71	7.79	.55	13.36	29.6
OCT	16.84	.36	1.72	7.84	.57	13.51	25.7
NOV	36.64	.06	1.67	7.61	.55	13.11	21.2
DEC	71.89	.00	1.76	8.02	.57	13.76	12.4
YEAR	326.71	9.89	20.42	93.20	6.73	160.31	30.9

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 147414. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 NIGHT SETBACK (FT L.  
WOOD

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.2101E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1730E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.1440E+06	-.1850E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1865E+06	-.1234E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.2119E+06	-.4238E+05
JUN	2567.	1933.	1.000	72.	0.	0.	2	0	.2455E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	11	0	.2455E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	4	0	.2455E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.2316E+06	-.3762E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.2013E+06	-.9190E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.1286E+06	-.1343E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1781E+06



BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 DDC (FT L. WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 34650.820000

FLOOR AREA (SQFT) 3706.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 325000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -245500.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 37060.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 358.000000

## INFILTRATION PROFILE

.930	.930	.930	.930	.930	.930	.930	.930
.930	.930	.930	.930	.930	.930	.930	.930
1.00	1.00	1.00	1.00	.930	.930	.930	.930

A FACTOR IN INFILTRATION EQUATION (CINA) 6.200000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 9170.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 158.900000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 67.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	207.0	542.0	851.0	994.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	107.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.7
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4011.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		6.100000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 78.0 78.0 78.0				
78.0 78.0 78.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 68.0 68.0 68.0				
68.0 68.0 68.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

KW				BTU/HR		THERMOSTAT SET	
LIGHTS				PEOPLE		POINT DEG F	
PROCESS				SENSIBLE		LATENT	
						HEATING COOLING	

PEAK VAL	8.	43435.	8620.	9820.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.012	.000	.000	55.0	90.0	
2	.100	.012	.000	.000	55.0	90.0	
3	.100	.012	.000	.000	55.0	90.0	
4	.100	.012	.000	.000	55.0	90.0	
5	.100	.012	.000	.000	55.0	90.0	
6	.100	.012	.000	.000	55.0	90.0	
7	.100	.012	.000	.000	55.0	90.0	
8	.100	.012	.000	.000	55.0	90.0	
9	.100	.012	.000	.000	55.0	90.0	
10	.100	.012	.000	.000	55.0	90.0	
11	.100	.012	.000	.000	55.0	90.0	
12	.100	.012	.000	.000	55.0	90.0	
13	.100	.012	.000	.000	55.0	90.0	
14	.100	.012	.000	.000	55.0	90.0	
15	.100	.012	.000	.000	55.0	90.0	
16	.100	.012	.000	.000	55.0	90.0	
17	1.000	.600	.600	.600	55.0	90.0	
18	1.000	.900	1.000	1.000	68.0	78.0	
19	1.000	.900	1.000	1.000	68.0	78.0	
20	1.000	.600	.500	.500	68.0	78.0	
21	.100	.012	.000	.000	55.0	90.0	
22	.100	.012	.000	.000	55.0	90.0	
23	.100	.012	.000	.000	55.0	90.0	
24	.100	.012	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)				65.000000			
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)				60.000000			
SYSTEM TYPE, (IECN)				2			
SUPPLY AIR CFM (SACFM)				6000.000000			
ECONOMIZER HIGH TEMP LIMIT F				65.000000			
SYSTEM SUPPLY AIR START TIME HR				0.000000E+00			
SYSTEM SUPPLY AIR STOP TIME HR				24.000000			
SYSTEM MIXED AIR TEMP(TMXAIR)				58.000000			
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)				1.000000E-01			
FAN EFFICIENCY (EFAN)				5.500000E-01			
FAN TOTAL PRESSURE IN. WATER (DP)				6.000000E-01			
HEATING PLANT RATED OUTPUT BTU (HFLOT)				330000.000000			
HEATING PLANT RATED INPUT BTU (HFLIN)				412500.000000			
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)				3			
COOLING PLANT RATED OUTPUT BTU (CFLOT)				245500.000000			
COOLING PLANT RATED INPUT BTU (CFLIN)				64704.000000			
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 DDC (FT L. WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	1.31	.03	.01	.00	.13	.00	.07	.00
	-39.14	LOSS		-9.19	-3.95	.00	-8.38	-.98	-31.83	.00
FEB	.00	GAIN	1.78	.08	.01	.00	.35	.00	.04	.00
	-29.63	LOSS		-7.45	-3.30	.00	-5.85	-.82	-26.77	.00
MAR	.70	GAIN	2.27	.36	.04	.00	1.21	.01	.28	.09
	-21.79	LOSS		-6.61	-2.99	.00	-4.20	-.74	-24.43	.00
APR	4.49	GAIN	2.40	.90	.09	.00	2.48	.02	.66	.53
	-6.74	LOSS		-4.06	-1.75	.00	-1.72	-.44	-14.42	.00
MAY	10.40	GAIN	2.64	1.32	.14	.00	3.68	.04	.96	1.97
	-.66	LOSS		-2.96	-1.23	.00	-.64	-.30	-9.35	.00
JUN	20.07	GAIN	2.76	1.52	.13	.00	4.27	.03	.87	7.16
	.00	LOSS		-2.30	-.91	.00	-.27	-.22	-6.13	.00
JUL	26.67	GAIN	2.78	1.99	.23	.00	4.96	.06	1.53	9.75
	.00	LOSS		-2.15	-.72	.00	-.20	-.18	-5.03	.00
AUG	23.26	GAIN	2.48	1.67	.19	.00	4.07	.05	1.28	8.29
	.00	LOSS		-2.21	-.75	.00	-.24	-.18	-4.98	.00
SEP	13.14	GAIN	2.06	1.09	.20	.00	2.76	.05	1.38	4.71
	-.84	LOSS		-2.93	-1.04	.00	-.72	-.26	-8.51	.00
OCT	3.28	GAIN	1.65	.50	.12	.00	1.35	.03	.85	.70
	-4.99	LOSS		-4.21	-1.56	.00	-1.92	-.38	-12.39	.00
NOV	.53	GAIN	1.20	.18	.06	.00	.48	.02	.45	.09
	-16.31	LOSS		-5.87	-2.34	.00	-4.20	-.57	-18.41	.00
DEC	.00	GAIN	1.07	.03	.02	.00	.07	.00	.11	.00
	-38.17	LOSS		-9.12	-3.86	.00	-8.51	-.95	-30.78	.00
TOT	103.	GAIN	24.	10.	1.	0.	26.	0.	8.	33.
	-158.	LOSS		-59.	-24.	0.	-37.	-6.	-193.	0.

MAX HEATING LOAD= -195567. BTUH ON JAN 28 HOUR 14  
 MAX COOLING LOAD= 245500. BTUH ON JUL 31 HOUR 18

AMBIENT TEMP 18.  
 AMBIENT TEMP 88.

ZONE UA BTU/HR-F

1218.1

## BEACON Energy Analysis By Energy Systems Engineers, Inc.

639A-1.I

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 DDC (FT L. WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	58.	79.	54.	4 27	19 7	58. 4.	1.72	7.84	1.95	13.51
FEB	59.	80.	54.	25 2	20 7	47. 14.	1.57	7.15	1.76	12.30
MAR	60.	90.	54.	28 4	17 6	75. 15.	1.74	7.93	1.95	13.64
APR	66.	91.	54.	30 9	17 6	83. 30.	1.69	7.70	1.89	13.23
MAY	72.	91.	55.	29 11	17 5	85. 39.	1.72	7.84	1.95	13.51
JUN	78.	91.	60.	29 17	17 6	86. 57.	1.69	7.70	1.89	13.23
JUL	80.	91.	62.	26 10	17 6	93. 60.	1.74	7.93	1.95	13.64
AUG	79.	91.	58.	29 25	17 7	94. 55.	1.72	7.84	1.95	13.51
SEP	74.	91.	55.	10 15	17 6	86. 39.	1.71	7.79	1.89	13.36
OCT	66.	91.	54.	4 28	17 6	79. 33.	1.72	7.84	1.95	13.51
NOV	61.	85.	54.	8 3	17 7	72. 18.	1.67	7.61	1.89	13.11
DEC	58.	83.	54.	23 18	20 7	55. -1.	1.76	8.02	1.95	13.76
YEAR							20.42	93.20	22.97	160.31

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 DDC (FT L. WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	605	5	0	0	-.1956E+06	.0000
FEB	510	13	0	0	-.1585E+06	.0000
MAR	451	30	0	0	-.1705E+06	.1293E+06
APR	210	76	0	0	-.1089E+06	.1719E+06
MAY	32	131	0	0	-.4271E+05	.1974E+06
JUN	0	170	0	0	.0000	.2390E+06
JUL	0	226	0	6	.0000	.2455E+06
AUG	0	194	0	0	.0000	.2425E+06
SEP	49	140	0	0	-.3787E+05	.2171E+06
OCT	201	69	0	0	-.7742E+05	.1868E+06
NOV	369	34	0	0	-.1197E+06	.1140E+06
DEC	623	10	0	0	-.1780E+06	.0000
YEAR	3050	1098	0	6	-.1956E+06	.2455E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	71.10	.00	1.72	7.84	.57	13.51	12.4	
FEB	57.10	.00	1.57	7.15	.52	12.30	12.4	
MAR	46.08	.07	1.74	7.93	.57	13.64	24.2	
APR	18.64	.44	1.69	7.70	.55	13.23	24.7	
MAY	2.56	1.01	1.72	7.84	.57	13.51	26.7	
JUN	.00	1.87	1.69	7.70	.55	13.23	29.6	
JUL	.00	2.45	1.74	7.93	.57	13.64	30.6	
AUG	.00	2.14	1.72	7.84	.57	13.51	29.8	
SEP	3.86	1.23	1.71	7.79	.55	13.36	29.2	
OCT	16.66	.33	1.72	7.84	.57	13.51	24.9	
NOV	35.95	.06	1.67	7.61	.55	13.11	20.2	
DEC	71.19	.00	1.76	8.02	.57	13.76	12.4	
YEAR	323.14	9.58	20.42	93.20	6.73	160.31	30.6	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 146166. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 DDC (FT L. WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0 0	.0000	-.1956E+06
FEB	1421.	901.	1.000	37.	0.	0.	0 0	.0000	-.1585E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0 0	.1293E+06	-.1705E+06
APR	2242.	1552.	1.000	55.	0.	0.	0 0	.1719E+06	-.1089E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0 0	.1974E+06	-.4271E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0 0	.2390E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	6 0	.2455E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0 0	.2425E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0 0	.2171E+06	-.3787E+05
OCT	1394.	924.	1.000	57.	0.	0.	0 0	.1868E+06	-.7742E+05
NOV	1008.	710.	1.000	47.	0.	0.	0 0	.1140E+06	-.1197E+06
DEC	856.	586.	1.000	35.	0.	0.	0 0	.0000	-.1780E+06



BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 ECONOMIZER (FT L. WOOD,  
M

----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
NUMBER OF ZONES (NZ) 1  
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 34650.820000

FLOOR AREA (SQFT) 3706.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 325000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -245500.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 37060.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 358.000000

INFILTRATION PROFILE

.930	.930	.930	.930	.930	.930	.930	.930
.930	.930	.930	.930	.930	.930	.930	.930
1.00	1.00	1.00	1.00	.930	.930	.930	.930

A FACTOR IN INFILTRATION EQUATION (CINA) 6.200000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 9170.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 158.900000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 67.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUDO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	207.0	542.0	851.0	994.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	107.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.7
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4011.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		6.100000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 78.0 78.0 78.0				
78.0 78.0 78.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 68.0 68.0 68.0				
68.0 68.0 68.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	-----	BTU/HR	-----		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	8.	43435.	8620.	9820.			
HOURLY FRACTION OF PEAK							
1	.100	.012	.000	.000	55.0	90.0	
2	.100	.012	.000	.000	55.0	90.0	
3	.100	.012	.000	.000	55.0	90.0	
4	.100	.012	.000	.000	55.0	90.0	
5	.100	.012	.000	.000	55.0	90.0	
6	.100	.012	.000	.000	55.0	90.0	
7	.100	.012	.000	.000	55.0	90.0	
8	.100	.012	.000	.000	55.0	90.0	
9	.100	.012	.000	.000	55.0	90.0	
10	.100	.012	.000	.000	55.0	90.0	
11	.100	.012	.000	.000	55.0	90.0	
12	.100	.012	.000	.000	55.0	90.0	
13	.100	.012	.000	.000	55.0	90.0	
14	.100	.012	.000	.000	55.0	90.0	
15	.100	.012	.000	.000	55.0	90.0	
16	.100	.012	.000	.000	55.0	90.0	
17	1.000	.600	.600	.600	55.0	90.0	
18	1.000	.900	1.000	1.000	68.0	78.0	
19	1.000	.900	1.000	1.000	68.0	78.0	
20	1.000	.600	.500	.500	68.0	78.0	
21	.100	.012	.000	.000	55.0	90.0	
22	.100	.012	.000	.000	55.0	90.0	
23	.100	.012	.000	.000	55.0	90.0	
24	.100	.012	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000		
SYSTEM TYPE, (IECN) 2							
SUPPLY AIR CFM (SACFM)					6000.000000		
ECONOMIZER HIGH TEMP LIMIT F					75.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					58.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					330000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					412500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH) 3							
COOLING PLANT RATED OUTPUT BTU (CFLOT)					245500.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					64704.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 ECONOMIZER (FT L. WOOD,  
M

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	1.31	.03	.01	.00	.13	.00	.07	.00
	-39.14	LOSS		-9.19	-3.95	.00	-8.38	-.98	-31.83	.00
FEB	.00	GAIN	1.78	.08	.01	.00	.35	.00	.04	.00
	-29.63	LOSS		-7.45	-3.30	.00	-5.85	-.82	-26.77	.00
MAR	.54	GAIN	2.27	.36	.04	.00	1.21	.01	.28	.28
	-21.79	LOSS		-6.61	-2.99	.00	-4.20	-.74	-24.79	.00
APR	3.26	GAIN	2.40	.90	.09	.00	2.48	.02	.66	1.24
	-6.74	LOSS		-4.06	-1.75	.00	-1.72	-.44	-16.36	.00
MAY	9.03	GAIN	2.64	1.32	.14	.00	3.68	.04	.96	3.18
	-.66	LOSS		-2.96	-1.23	.00	-.64	-.30	-11.93	.00
JUN	21.45	GAIN	2.76	1.52	.13	.00	4.26	.03	.87	11.48
	.00	LOSS		-2.31	-.92	.00	-.28	-.22	-9.05	.00
JUL	26.99	GAIN	2.78	1.99	.23	.00	4.94	.06	1.53	10.94
	.00	LOSS		-2.16	-.73	.00	-.21	-.18	-5.87	.00
AUG	23.61	GAIN	2.48	1.67	.19	.00	4.06	.05	1.28	9.40
	.00	LOSS		-2.21	-.75	.00	-.24	-.18	-5.71	.00
SEP	13.62	GAIN	2.06	1.09	.20	.00	2.75	.05	1.38	6.75
	-.84	LOSS		-2.94	-1.04	.00	-.72	-.26	-10.06	.00
OCT	2.78	GAIN	1.65	.50	.12	.00	1.35	.03	.85	1.74
	-4.99	LOSS		-4.21	-1.56	.00	-1.92	-.38	-13.93	.00
NOV	.13	GAIN	1.20	.18	.06	.00	.48	.02	.45	.11
	-16.31	LOSS		-5.87	-2.34	.00	-4.20	-.57	-18.83	.00
DEC	.00	GAIN	1.07	.03	.02	.00	.07	.00	.11	.00
	-38.17	LOSS		-9.12	-3.86	.00	-8.51	-.95	-30.78	.00
TOT	101.	GAIN	24.	10.	1.	0.	26.	0.	8.	45.
	-158.	LOSS		-59.	-24.	0.	-37.	-6.	-206.	0.

MAX HEATING LOAD= -195567. BTUH ON JAN 28 HOUR 14  
MAX COOLING LOAD= 245500. BTUH ON SEP 23 HOUR 19

AMBIENT TEMP 18.  
AMBIENT TEMP 75.

ZONE UA BTU/HR-F

1218.1

## BEACON Energy Analysis By Energy Systems Engineers, Inc.

639A-3.I

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 ECONOMIZER (FT L. WOOD,  
M

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	58.	79.	54.	4 27	19 7	58. 4.	1.72	7.84	1.95	13.51
FEB	59.	80.	54.	25 2	20 7	47. 14.	1.57	7.15	1.76	12.30
MAR	60.	90.	54.	28 4	17 6	75. 15.	1.74	7.93	1.95	13.64
APR	66.	91.	54.	30 9	17 6	83. 30.	1.69	7.70	1.89	13.23
MAY	72.	91.	55.	29 11	17 5	85. 39.	1.72	7.84	1.95	13.51
JUN	78.	91.	60.	29 17	17 6	86. 57.	1.69	7.70	1.89	13.23
JUL	81.	91.	62.	26 10	17 6	93. 60.	1.74	7.93	1.95	13.64
AUG	79.	91.	58.	29 25	17 7	94. 55.	1.72	7.84	1.95	13.51
SEP	74.	91.	55.	10 15	17 6	86. 39.	1.71	7.79	1.89	13.36
OCT	66.	91.	54.	4 28	17 6	79. 33.	1.72	7.84	1.95	13.51
NOV	61.	85.	54.	8 3	17 7	72. 18.	1.67	7.61	1.89	13.11
DEC	58.	83.	54.	23 18	20 7	55. -1.	1.76	8.02	1.95	13.76
YEAR							20.42	93.20	22.97	160.31

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 ECONOMIZER (FT L. WOOD,  
M

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	605	5	0	0	-.1956E+06	.0000
FEB	510	13	0	0	-.1585E+06	.0000
MAR	451	30	0	0	-.1705E+06	.1540E+06
APR	210	76	0	0	-.1089E+06	.1719E+06
MAY	32	131	0	0	-.4271E+05	.2173E+06
JUN	0	170	0	5	.0000	.2455E+06
JUL	0	226	0	11	.0000	.2455E+06
AUG	0	194	0	1	.0000	.2455E+06
SEP	49	141	0	5	-.3787E+05	.2455E+06
OCT	201	69	0	0	-.7742E+05	.2041E+06
NOV	369	34	0	0	-.1197E+06	.5148E+05
DEC	623	10	0	0	-.1780E+06	.0000
YEAR	3050	1099	0	22	-.1956E+06	.2455E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		MILLION BTU		
JAN	71.10	.00	1.72	7.84	.57	13.51	12.4	
FEB	57.10	.00	1.57	7.15	.52	12.30	12.4	
MAR	46.08	.05	1.74	7.93	.57	13.64	26.0	
APR	18.64	.33	1.69	7.70	.55	13.23	25.6	
MAY	2.56	.86	1.72	7.84	.57	13.51	29.8	
JUN	.00	1.91	1.69	7.70	.55	13.23	31.3	
JUL	.00	2.45	1.74	7.93	.57	13.64	31.3	
AUG	.00	2.14	1.72	7.84	.57	13.51	29.8	
SEP	3.86	1.22	1.71	7.79	.55	13.36	31.3	
OCT	16.66	.26	1.72	7.84	.57	13.51	25.9	
NOV	35.95	.01	1.67	7.61	.55	13.11	15.1	
DEC	71.19	.00	1.76	8.02	.57	13.76	12.4	
YEAR	323.14	9.24	20.42	93.20	6.73	160.31	31.3	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 145854. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 ECONOMIZER (FT L. WOOD,  
M

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1956E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1585E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.1540E+06	-.1705E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.1719E+06	-.1089E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.2173E+06	-.4271E+05
JUN	2567.	1933.	1.000	72.	0.	0.	5	0	.2455E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	11	0	.2455E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	1	0	.2455E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	5	0	.2455E+06	-.3787E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.2041E+06	-.7742E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.5148E+05	-.1197E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1780E+06



BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (NIGHTTIME)  
(F)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
NUMBER OF ZONES (NZ) 1  
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 34650.820000

FLOOR AREA (SQFT) 3706.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 325000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -245500.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 37060.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 358.000000

## INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 6.200000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 9170.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 158.900000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 67.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	207.0	542.0	851.0	994.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	107.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.7
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4011.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,END)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			6.100000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL HOUR	LIGHTS 8.	PROCESS 43435.	SENSIBLE 8620.	LATENT 9820.	HEATING	COOLING
-----						
KW - - - - - BTU/HR - - - - -						
PEOPLE PEOPLE						
HOURLY FRACTION OF PEAK - - - - -						
1	.100	.012	.000	.000	70.0	76.0
2	.100	.012	.000	.000	70.0	76.0
3	.100	.012	.000	.000	70.0	76.0
4	.100	.012	.000	.000	70.0	76.0
5	.100	.012	.000	.000	70.0	76.0
6	.100	.012	.000	.000	70.0	76.0
7	.100	.012	.000	.000	70.0	76.0
8	.100	.012	.000	.000	70.0	76.0
9	.100	.012	.000	.000	70.0	76.0
10	.100	.012	.000	.000	70.0	76.0
11	.100	.012	.000	.000	70.0	76.0
12	.100	.012	.000	.000	70.0	76.0

13	.100	.012	.000	.000	70.0	76.0
14	.100	.012	.000	.000	70.0	76.0
15	.100	.012	.000	.000	70.0	76.0
16	.100	.012	.000	.000	70.0	76.0
17	1.000	.600	.600	.600	70.0	76.0
18	1.000	.900	1.000	1.000	70.0	76.0
19	1.000	.900	1.000	1.000	70.0	76.0
20	1.000	.600	.500	.500	70.0	76.0
21	.100	.012	.000	.000	70.0	76.0
22	.100	.012	.000	.000	70.0	76.0
23	.100	.012	.000	.000	70.0	76.0
24	.100	.012	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					6000.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					58.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					330000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					412500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.451
.500	.537	.600	.625	.700	.718	.812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					3	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					245500.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					64704.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (NIGHTTIME)  
(F)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

			SOLAR	PARTITN					VENT	
MNTH LOAD			THRU	DOOR	AND	BSMT	WALL	WINDOW	INFL	LATENT
			WINDOW	ROOF	SLAB					
JAN	.00	GAIN	1.31	.00	.00	.00	.01	.00	.00	.00
	-62.98	LOSS		-13.22	-5.97	.00	-13.93	-1.49	-43.21	.00
FEB	.00	GAIN	1.78	.00	.00	.00	.02	.00	.00	.00
	-50.92	LOSS		-10.94	-5.07	.00	-10.52	-1.27	-37.23	.00
MAR	1.11	GAIN	2.27	.17	.00	.00	.49	.00	.03	.17
	-42.80	LOSS		-9.90	-4.69	.00	-8.36	-1.17	-34.35	.00
APR	6.53	GAIN	2.40	.73	.04	.00	1.81	.01	.25	.89
	-20.01	LOSS		-5.93	-2.71	.00	-3.94	-.68	-19.55	.00
MAY	15.86	GAIN	2.64	1.46	.12	.00	3.68	.03	.76	3.59
	-6.16	LOSS		-3.57	-1.44	.00	-1.30	-.35	-9.42	.00
JUN	34.46	GAIN	2.76	2.21	.30	.00	5.46	.07	1.95	14.42
	-.72	LOSS		-2.11	-.64	.00	-.25	-.15	-3.50	.00
JUL	47.08	GAIN	2.78	3.07	.71	.00	7.11	.18	4.56	19.30
	-.26	LOSS		-1.62	-.40	.00	-.11	-.10	-2.29	.00
AUG	42.60	GAIN	2.48	2.55	.54	.00	5.78	.13	3.37	18.61
	-.54	LOSS		-1.81	-.46	.00	-.16	-.11	-2.37	.00
SEP	23.60	GAIN	2.06	1.35	.29	.00	3.24	.07	1.96	10.01
	-5.72	LOSS		-3.29	-1.18	.00	-1.33	-.29	-8.43	.00
OCT	5.29	GAIN	1.65	.37	.06	.00	.86	.01	.38	1.40
	-18.68	LOSS		-6.20	-2.55	.00	-4.40	-.62	-17.87	.00
NOV	.77	GAIN	1.20	.06	.00	.00	.17	.00	.03	.16
	-34.38	LOSS		-8.80	-3.80	.00	-8.16	-.93	-26.65	.00
DEC	.00	GAIN	1.07	.00	.00	.00	.00	.00	.00	.00
	-61.94	LOSS		-13.16	-5.88	.00	-14.14	-1.45	-42.15	.00
TOT	177.	GAIN	24.	12.	2.	0.	29.	1.	13.	69.
	-305.	LOSS		-81.	-35.	0.	-67.	-9.	-247.	0.

MAX HEATING LOAD= -229631. BTUH ON DEC 18 HOUR 8      AMBIENT TEMP 1.  
MAX COOLING LOAD= 220347. BTUH ON JUL 28 HOUR 18      AMBIENT TEMP 90.

ZONE UA BTU/HR-F 1218.1

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (NIGHTTIME)  
(F

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	77.	68.	4 27	19 7	58. 4.	1.72	7.84	1.95	13.51
FEB	70.	77.	69.	25 2	19 7	47. 14.	1.57	7.15	1.76	12.30
MAR	71.	78.	69.	10 4	19 6	63. 15.	1.74	7.93	1.95	13.64
APR	72.	78.	69.	29 9	19 6	69. 30.	1.69	7.70	1.89	13.23
MAY	73.	78.	69.	26 3	19 8	75. 66.	1.72	7.84	1.95	13.51
JUN	75.	78.	69.	30 10	19 6	82. 66.	1.69	7.70	1.89	13.23
JUL	76.	79.	69.	15 24	18 7	92. 67.	1.74	7.93	1.95	13.64
AUG	76.	78.	70.	11 25	19 6	84. 51.	1.72	7.84	1.95	13.51
SEP	74.	78.	69.	2 18	19 9	83. 66.	1.71	7.79	1.89	13.36
OCT	72.	78.	68.	14 24	19 7	71. 67.	1.72	7.84	1.95	13.51
NOV	71.	78.	67.	17 8	19 7	59. 66.	1.67	7.61	1.89	13.11
DEC	70.	78.	68.	23 18	19 8	54. 1.	1.76	8.02	1.95	13.76
YEAR							20.42	93.20	22.97	160.31

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (NIGHTTIME)  
(F)

NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED						
MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	693	12	0	0	-.1988E+06	.0000
FEB	596	28	0	0	-.1770E+06	.0000
MAR	598	65	0	0	-.1768E+06	.1252E+06
APR	417	152	0	0	-.1125E+06	.1355E+06
MAY	265	266	0	0	-.7399E+05	.1627E+06
JUN	58	400	0	0	-.2645E+05	.2039E+06
JUL	28	530	0	0	-.2293E+05	.2203E+06
AUG	38	494	0	0	-.3456E+05	.2066E+06
SEP	173	320	0	0	-.6938E+05	.2021E+06
OCT	427	143	0	0	-.9669E+05	.1274E+06
NOV	553	66	0	0	-.1454E+06	.8926E+05
DEC	684	23	0	0	-.2296E+06	.0000
YEAR	4530	2499	0	0	-.2296E+06	.2203E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	100.11	.00	1.72	7.84	.57	13.51	12.4
FEB	82.60	.00	1.57	7.15	.52	12.30	12.4
MAR	74.56	.12	1.74	7.93	.57	13.64	24.1
APR	42.35	.69	1.69	7.70	.55	13.23	24.8
MAY	21.91	1.65	1.72	7.84	.57	13.51	26.6
JUN	4.56	3.44	1.69	7.70	.55	13.23	29.0
JUL	2.20	4.64	1.74	7.93	.57	13.64	29.9
AUG	2.99	4.26	1.72	7.84	.57	13.51	29.2
SEP	14.99	2.37	1.71	7.79	.55	13.36	28.9
OCT	41.30	.56	1.72	7.84	.57	13.51	24.3
NOV	63.91	.09	1.67	7.61	.55	13.11	18.3
DEC	98.50	.00	1.76	8.02	.57	13.76	12.4
YEAR	549.97	17.80	20.42	93.20	6.73	160.31	29.9

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 214949. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (NIGHTTIME)  
(F)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0 0	.0000	-.1988E+06
FEB	1421.	901.	1.000	37.	0.	0.	0 0	.0000	-.1770E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0 0	.1252E+06	-.1768E+06
APR	2242.	1552.	1.000	55.	0.	0.	0 0	.1355E+06	-.1125E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0 0	.1627E+06	-.7399E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0 0	.2039E+06	-.2645E+05
JUL	2470.	1954.	1.000	77.	0.	0.	0 0	.2203E+06	-.2293E+05
AUG	2211.	1784.	1.000	76.	0.	0.	0 0	.2066E+06	-.3456E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0 0	.2021E+06	-.6938E+05
OCT	1394.	924.	1.000	57.	0.	0.	0 0	.1274E+06	-.9669E+05
NOV	1008.	710.	1.000	47.	0.	0.	0 0	.8926E+05	-.1454E+06
DEC	856.	586.	1.000	35.	0.	0.	0 0	.0000	-.2296E+06



BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (DAYTIME) (FT

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 34650.820000

FLOOR AREA (SQFT) 3706.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 325000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -245500.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 37060.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 358.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 6.200000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 9170.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 158.900000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 67.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	207.0	542.0	851.0	994.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	107.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.7
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0

U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4011.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		6.100000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET	
					POINT DEG F	
	KW	BTU/HR	PEOPLE	PEOPLE		
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	43435.	8620.	9820.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.012	.000	.000	70.0	76.0
2	.100	.012	.000	.000	70.0	76.0
3	.100	.012	.000	.000	70.0	76.0
4	.100	.012	.000	.000	70.0	76.0
5	.100	.012	.000	.000	70.0	76.0
6	.100	.012	.000	.000	70.0	76.0
7	.100	.012	.000	.000	70.0	76.0
8	.100	.012	.000	.000	70.0	76.0
9	.100	.012	.000	.000	70.0	76.0
10	.100	.012	.000	.000	70.0	76.0
11	.100	.012	.000	.000	70.0	76.0
12	.100	.012	.000	.000	70.0	76.0
13	.100	.012	.000	.000	70.0	76.0

14	.100	.012	.000	.000	70.0	76.0
15	.100	.012	.000	.000	70.0	76.0
16	.100	.012	.000	.000	70.0	76.0
17	1.000	.600	.600	.600	70.0	76.0
18	1.000	.900	1.000	1.000	70.0	76.0
19	1.000	.900	1.000	1.000	70.0	76.0
20	1.000	.600	.500	.500	70.0	76.0
21	.100	.012	.000	.000	70.0	76.0
22	.100	.012	.000	.000	70.0	76.0
23	.100	.012	.000	.000	70.0	76.0
24	.100	.012	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					6000.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					58.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					330000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					412500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					3	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					245500.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					64704.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (DAYTIME)  
(FT)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

			SOLAR	PARTITN				VENT		
MNTH	LOAD		THRU	DOOR	SLAB	BSMT	WALL	WINDOW	INFL	LATENT
			WINDOW	AND						
JAN	.00	GAIN	1.31	.00	.00	.00	.01	.00	.00	.00
	-66.05	LOSS		-13.18	-5.95	.00	-13.89	-1.48	-46.37	.00
FEB	.00	GAIN	1.78	.00	.00	.00	.02	.00	.00	.00
	-53.28	LOSS		-10.91	-5.06	.00	-10.48	-1.26	-39.68	.00
MAR	1.11	GAIN	2.27	.17	.00	.00	.49	.00	.02	.19
	-45.14	LOSS		-9.86	-4.67	.00	-8.31	-1.17	-36.81	.00
APR	6.41	GAIN	2.40	.73	.04	.00	1.82	.01	.21	.89
	-21.54	LOSS		-5.88	-2.69	.00	-3.88	-.67	-21.30	.00
MAY	15.37	GAIN	2.64	1.46	.12	.00	3.71	.03	.63	3.35
	-7.23	LOSS		-3.52	-1.42	.00	-1.26	-.34	-10.75	.00
JUN	33.20	GAIN	2.76	2.21	.31	.00	5.52	.08	1.65	13.69
	-1.05	LOSS		-2.06	-.61	.00	-.21	-.15	-4.25	.00
JUL	46.59	GAIN	2.78	3.07	.71	.00	7.15	.18	4.09	19.49
	-.40	LOSS		-1.59	-.38	.00	-.09	-.09	-2.76	.00
AUG	41.90	GAIN	2.48	2.55	.54	.00	5.83	.13	2.99	18.52
	-.71	LOSS		-1.77	-.44	.00	-.14	-.11	-2.92	.00
SEP	22.73	GAIN	2.06	1.35	.29	.00	3.27	.07	1.68	9.57
	-6.52	LOSS		-3.25	-1.16	.00	-1.30	-.28	-9.51	.00
OCT	5.09	GAIN	1.65	.37	.06	.00	.87	.01	.30	1.35
	-20.15	LOSS		-6.16	-2.53	.00	-4.35	-.62	-19.52	.00
NOV	.75	GAIN	1.20	.06	.00	.00	.17	.00	.03	.16
	-36.43	LOSS		-8.76	-3.79	.00	-8.11	-.92	-28.84	.00
DEC	.00	GAIN	1.07	.00	.00	.00	.00	.00	.00	.00
	-64.99	LOSS		-13.13	-5.86	.00	-14.10	-1.44	-45.29	.00
TOT	173.	GAIN	24.	12.	2.	0.	29.	1.	12.	67.
	-323.	LOSS		-80.	-35.	0.	-66.	-9.	-268.	0.

MAX HEATING LOAD= -235161. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
MAX COOLING LOAD= 241825. BTUH ON JUL 28 HOUR 18 AMBIENT TEMP 90.

ZONE UA BTU/HR-F 1218.1

## BEACON Energy Analysis By Energy Systems Engineers, Inc.

639A-5.I

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (DAYTIME)  
(FT

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	77.	68.	4 27	19 7	58. 4.	1.72	7.84	1.95	13.51
FEB	70.	77.	69.	25 2	19 7	47. 14.	1.57	7.15	1.76	12.30
MAR	70.	78.	69.	10 4	19 6	63. 15.	1.74	7.93	1.95	13.64
APR	72.	78.	69.	29 9	19 6	69. 30.	1.69	7.70	1.89	13.23
MAY	73.	78.	69.	26 11	19 6	75. 39.	1.72	7.84	1.95	13.51
JUN	75.	78.	69.	30 10	19 6	82. 66.	1.69	7.70	1.89	13.23
JUL	76.	79.	69.	15 24	18 7	92. 67.	1.74	7.93	1.95	13.64
AUG	76.	78.	70.	11 25	19 6	84. 51.	1.72	7.84	1.95	13.51
SEP	74.	78.	68.	2 5	19 7	83. 66.	1.71	7.79	1.89	13.36
OCT	72.	78.	68.	14 24	19 7	71. 67.	1.72	7.84	1.95	13.51
NOV	70.	78.	67.	17 8	19 7	59. 66.	1.67	7.61	1.89	13.11
DEC	70.	78.	68.	23 18	19 7	54. -1.	1.76	8.02	1.95	13.76
YEAR							20.42	93.20	22.97	160.31

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (DAYTIME)  
(FT)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	705	6	0	0	-.2178E+06	.0000
FEB	612	21	0	0	-.1845E+06	.0000
MAR	610	58	0	0	-.1828E+06	.1274E+06
APR	429	143	0	0	-.1193E+06	.1378E+06
MAY	283	255	0	0	-.8607E+05	.1703E+06
JUN	74	382	0	0	-.3155E+05	.2227E+06
JUL	36	514	0	0	-.2764E+05	.2418E+06
AUG	43	475	0	0	-.4166E+05	.2261E+06
SEP	176	307	0	0	-.8147E+05	.2174E+06
OCT	437	136	0	0	-.1114E+06	.1345E+06
NOV	564	58	0	0	-.1590E+06	.8939E+05
DEC	698	18	0	0	-.2352E+06	.0000
YEAR	4667	2373	0	0	-.2352E+06	.2418E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	103.86	.00	1.72	7.84	.57	13.51	12.4
FEB	85.97	.00	1.57	7.15	.52	12.30	12.4
MAR	77.63	.12	1.74	7.93	.57	13.64	24.3
APR	44.51	.68	1.69	7.70	.55	13.23	25.0
MAY	23.87	1.59	1.72	7.84	.57	13.51	27.0
JUN	5.82	3.30	1.69	7.70	.55	13.23	30.1
JUL	2.83	4.57	1.74	7.93	.57	13.64	31.1
AUG	3.40	4.16	1.72	7.84	.57	13.51	30.2
SEP	15.99	2.28	1.71	7.79	.55	13.36	29.8
OCT	43.47	.54	1.72	7.84	.57	13.51	24.4
NOV	66.54	.08	1.67	7.61	.55	13.11	18.3
DEC	102.31	.00	1.76	8.02	.57	13.76	12.4
YEAR	576.17	17.31	20.42	93.20	6.73	160.31	31.1

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 221568. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange - Store/ Snack Bar - Zone 1 OUTSIDE AIR (DAYTIME)  
(FT

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG.	SYSTEM DRIFT F	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0 0	.0000	-.2178E+06
FEB	1421.	901.	1.000	37.	0.	0.	0 0	.0000	-.1845E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0 0	.1274E+06	-.1828E+06
APR	2242.	1552.	1.000	55.	0.	0.	0 0	.1378E+06	-.1193E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0 0	.1703E+06	-.8607E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0 0	.2227E+06	-.3155E+05
JUL	2470.	1954.	1.000	77.	0.	0.	0 0	.2418E+06	-.2764E+05
AUG	2211.	1784.	1.000	76.	0.	0.	0 0	.2261E+06	-.4166E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0 0	.2174E+06	-.8147E+05
OCT	1394.	924.	1.000	57.	0.	0.	0 0	.1345E+06	-.1114E+06
NOV	1008.	710.	1.000	47.	0.	0.	0 0	.8939E+05	-.1590E+06
DEC	856.	586.	1.000	35.	0.	0.	0 0	.0000	-.2352E+06



**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 63922  
BLDG. TYPE: PX (GAME ROOM)

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	85.0	44.8	43.4			
COOLING (kWH)	3370	1510	1430			

SUPPLY AIR FAN	1000 CFM
FLOOR AREA	1046 FT <sup>2</sup>
CFM/F	93 CFM
UA	446 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	1700	2000	15 HR	HR. ON HEATING	650 HR/YR
SAT.	1700	2000	3 HR	HR. ON COOLING	436 HR/YR
SUN.	1300	2000	7 HR	HR. OFF HEATING	3718 HR/YR
	TOTAL OCCUPY HR.		25 HR/WK	HR. OFF COOLING	2492 HR/YR
	TOTAL UNOCC. HR.		143 HR/WK		
	ANNUAL OCCUPY HR.		1304 HR/YR		
	ANNUAL UNOCC. HR.		7456 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 650 = 3718 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 436 = 2492 HR/YR

HOAUHC	85 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	93 CFM *	7456 HR/YR		
HOAUH	85 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	93 CFM *	3718 HR/YR		
COAUHC	3370 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	93 CFM *	7456 HR/YR		
COAUH	3370 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	93 CFM *	2492 HR/YR		
HOAOHC	85 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	93 CFM *	1304 HR/YR		
HOAOH	85 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	93 CFM *	650 HR/YR		
COAOHC	3370 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	93 CFM *	1304 HR/YR		
COAOH	3370 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	93 CFM *	436 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 639Z2  
BLDG. TYPE: PX (GAME ROOM)

**ENERGY CONSTANT CALCULATIONS**

ECC	1430 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	1000 CFM *	436 HR/YR		
ECHC	1430 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	1000 CFM *	1304 HR/YR		
NSUCHC	3370 KWH -	1510 KWH	=	2.49E-04 KWH/CFM-HR
	1000 CFM *	7456 HR/YR		
NSUCC	3370 KWH -	1510 KWH	=	7.46E-04 KWH/CFM-HR
	1000 CFM *	2492 HR/YR		
DDCCHC	1510 KWH -	1430 KWH	=	6.14E-05 KWH/CFM-HR
	1000 CFM *	1304 HR/YR		
DDCCC	1510 KWH -	1430 KWH	=	1.84E-04 KWH/CFM-HR
	1000 CFM *	436 HR/YR		
NSC	85 MBtu -	44.78 MBtu	=	9.02E+04 Btu/UA
	446 UA			
DSC	44.78 MBtu -	43.35 MBtu	=	3.21E+03 Btu/UA
	446 UA			
OPT	( 2 HR/DAY X 272 DAY/YR ) -		294 HR/YR	
			=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			
			=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 03-Feb-93

BY: BHS

JOB: 3204.000

CHK:

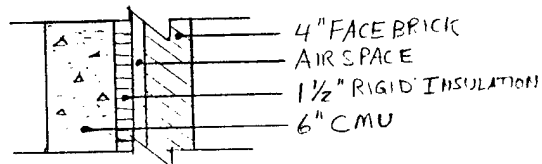
FILE: 639BZ1

**BUILDING HEATING LOAD CALCULATION SHEET**

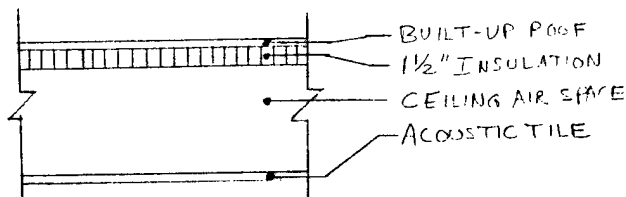
BLDG NO: 639B BLDG NAME: POST EXCHANGE - ZONE 2  
 BLDG FUNCTION: GAME ROOM # FLOORS 1  
 FLOOR AREA: (SQ. FT) 1,046  
 SLAB PERIMETER: (FT) 92

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	581	315	248	1,144
GLASS	(SQ. FT)	0	0	27	0	27
PERSONNEL DOOR	(SQ. FT)	0	0	49	0	49
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	581	239	248	1,068
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					1,046
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)		49
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" BRICK/METAL PANEL	0.19
3. AIR SPACE	0.91
4. 1.5" INSULATION	4.98
5. 6" CMU	1.89
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	8.82
U=1/R	0.113

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 1.5" INSULATION	4.98
4. CEILING AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	8.95
U=1/R	0.112

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)	M	1144	X CFM / SQ.FT.	0.069	=	79
AVG. WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS		10	X CFM / OPENING / HR	1.385	=	14
			TOTAL INFILTRATION (CFM)		=	93

UA ODOOR	= ODOOR AREA	0	X DOOR "U"	0.000	=	0
UA PDOOR	= PDOOR AREA	49	X DOOR "U"	0.391	=	19
UA WALL	= WALL AREA	1,068	X WALL "U"	0.113	=	121
UA ROOF	= ROOF AREA	1,046	X ROOF "U"	0.112	=	117
UA GLASS	= GLASS AREA	27	X GLASS "U"	0.621	=	17
UA SLAB	= SLAB PERIM.	92	X SLF	0.830	=	76
UA BASEM.	= B-WALL AREA	0	X BASE. "U"	0.000	=	0
INFILTRATION	= CFM	93	X A. T. F.	1.035	=	96

**TOTAL UA (BTU/HR°F) 446**

EMC NO.: 3204-000  
DATE: 03-Feb-93  
PREPARED BY: BHS  
CHECKED BY: CEL  
FILE: 639BZ1  
BLDG: 639B

**ZONE:**

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
1	10	5	Standing, light work, or walking slowly	Retail store, bank	270	220	2,700	2,200
TOTAL	10					TOTAL	2,700	2,200

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	2	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	336
	32	18	Incandescent - 60w	60	1,920
TOTAL	34			TOTAL	2,256

## Peak Value for Internal Gains

[illegible]

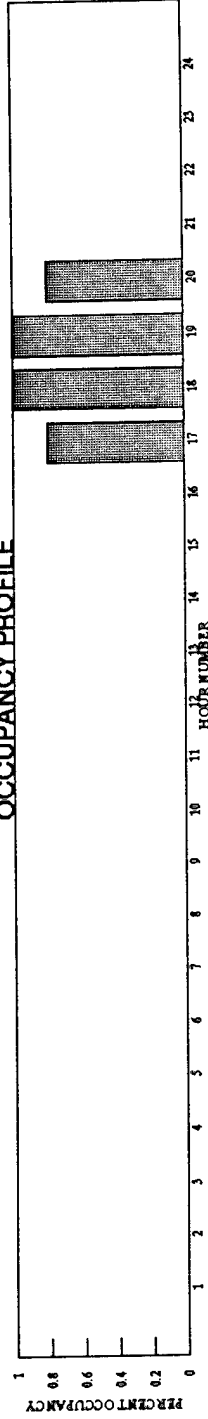
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

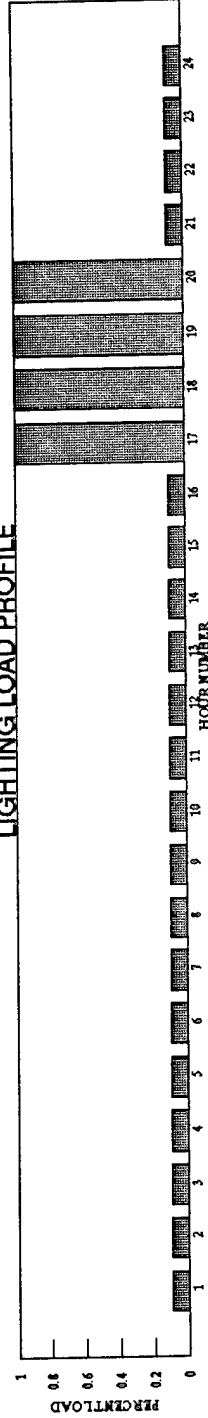
EMC NO.: 3204-000  
 DATE: 03-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 639BZ1  
 BLDG: 639B  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
4	Post Exchange	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

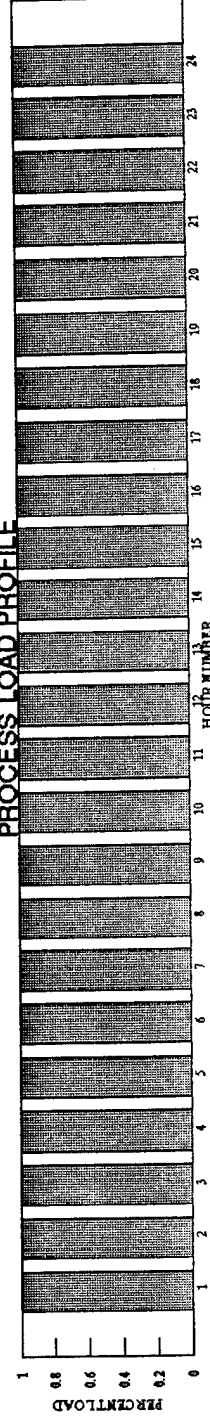
**OCCUPANCY PROFILE**



**LIGHTING LOAD PROFILE**



**PROCESS LOAD PROFILE**



BLDG 639 - Post Exchange Game room - Zone 2 BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 9415.590000

FLOOR AREA (SQFT) 1046.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 44000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -42000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 44000.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 93.000000

## INFILTRATION PROFILE

.850	.850	.850	.850	.850	.850	.850	.850
.850	.850	.850	.850	.850	.850	.850	.850
1.00	1.00	1.00	1.00	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 5.930000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 5230.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 75.900000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 19.100000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	581.0	248.0	.0	239.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	27.0
WINDOW HEIGHT FT (WNDH)	.0	.0	.0	2.7
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.113	.113	.113	.113
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00416	.00416	.00416	.00416
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00001	.00001	.00001	.00001
N=2	.00058	.00058	.00058	.00058
N=3	.00229	.00229	.00229	.00229
N=4	.00119	.00119	.00119	.00119
N=5	.00009	.00009	.00009	.00009
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.71940	-1.71940	-1.71940	-1.71940
N=3	.84375	.84375	.84375	.84375
N=4	-.09022	-.09022	-.09022	-.09022
N=5	.00268	.00268	.00268	.00268
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	1046.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			1.500000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL HOUR	LIGHTS 2.	PROCESS 1536.	BTU/HR		HEATING	COOLING
			PEOPLE SENSIBLE 2700.	PEOPLE LATENT 2200.		
----- HOURLY FRACTION OF PEAK -----						
1	.100	1.000	.000	.000	70.0	76.0
2	.100	1.000	.000	.000	70.0	76.0
3	.100	1.000	.000	.000	70.0	76.0
4	.100	1.000	.000	.000	70.0	76.0
5	.100	1.000	.000	.000	70.0	76.0
6	.100	1.000	.000	.000	70.0	76.0
7	.100	1.000	.000	.000	70.0	76.0
8	.100	1.000	.000	.000	70.0	76.0
9	.100	1.000	.000	.000	70.0	76.0
10	.100	1.000	.000	.000	70.0	76.0
11	.100	1.000	.000	.000	70.0	76.0
12	.100	1.000	.000	.000	70.0	76.0

13	.100	1.000	.000	.000	70.0	76.0
14	.100	1.000	.000	.000	70.0	76.0
15	.100	1.000	.000	.000	70.0	76.0
16	.100	1.000	.000	.000	70.0	76.0
17	1.000	1.000	.800	.800	70.0	76.0
18	1.000	1.000	1.000	1.000	70.0	76.0
19	1.000	1.000	1.000	1.000	70.0	76.0
20	1.000	1.000	.800	.800	70.0	76.0
21	.100	1.000	.000	.000	70.0	76.0
22	.100	1.000	.000	.000	70.0	76.0
23	.100	1.000	.000	.000	70.0	76.0
24	.100	1.000	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					1000.000000	
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					44000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					55000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					3	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					42000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					10750.000000	
COOLING PLANT PART LOAD VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			



BLDG 639 - Post Exchange Game room - Zone 2      BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR	PARTITN		BSMT	WALL	WINDOW	VENT	LATENT
			THRU	DOOR	SLAB				AND	
			WINDOW	AND					INFL	
JAN	.00	GAIN	.34	.00	.00	.00	.00	.00	.00	.00
	-12.95	LOSS		-3.41	-2.49	.00	-2.40	-.37	-8.10	.00
FEB	.00	GAIN	.46	.00	.00	.00	.01	.00	.00	.00
	-10.25	LOSS		-2.82	-2.11	.00	-1.78	-.32	-6.86	.00
MAR	.25	GAIN	.57	.05	.00	.00	.11	.00	.01	.04
	-8.31	LOSS		-2.56	-1.96	.00	-1.39	-.29	-6.15	.00
APR	1.24	GAIN	.60	.21	.02	.00	.34	.00	.05	.19
	-3.36	LOSS		-1.56	-1.15	.00	-.64	-.17	-3.38	.00
MAY	3.12	GAIN	.67	.40	.05	.00	.65	.01	.11	.71
	-.65	LOSS		-.99	-.66	.00	-.19	-.10	-1.66	.00
JUN	7.20	GAIN	.68	.59	.12	.00	.99	.02	.29	2.91
	.00	LOSS		-.62	-.33	.00	-.03	-.05	-.78	.00
JUL	10.26	GAIN	.70	.82	.29	.00	1.38	.04	.74	3.97
	.00	LOSS		-.46	-.20	.00	-.01	-.03	-.48	.00
AUG	9.42	GAIN	.61	.68	.22	.00	1.20	.03	.53	3.98
	-.01	LOSS		-.51	-.22	.00	-.02	-.03	-.53	.00
SEP	5.29	GAIN	.52	.36	.12	.00	.72	.02	.31	2.22
	-.71	LOSS		-.92	-.54	.00	-.19	-.08	-1.44	.00
OCT	1.05	GAIN	.42	.10	.02	.00	.23	.00	.06	.29
	-3.01	LOSS		-1.64	-1.10	.00	-.68	-.16	-2.98	.00
NOV	.19	GAIN	.31	.02	.00	.00	.06	.00	.00	.06
	-6.42	LOSS		-2.28	-1.60	.00	-1.31	-.23	-4.64	.00
DEC	.00	GAIN	.28	.00	.00	.00	.00	.00	.00	.00
	-12.58	LOSS		-3.40	-2.46	.00	-2.41	-.36	-7.78	.00
TOT	38.03	GAIN	6.17	3.23	.84	.00	5.69	.12	2.09	14.35
	-58.24	LOSS		-21.18	-14.82	.00	-11.04	-2.20	-44.77	.00

MAX HEATING LOAD= -44000. BTUH ON DEC 18 HOUR 8      AMBIENT TEMP 1.  
 MAX COOLING LOAD= 41398. BTUH ON JUL 28 HOUR 18      AMBIENT TEMP 90.

ZONE UA BTU/HR-F      273.7

BEACON Energy Analysis By Energy Systems Engineers, Inc.

639B.I

BLDG 639 - Post Exchange Game room - Zone 2 BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	75.	69.	4 27	20 6	58. 4.	.46	8.36	.33	3.48
FEB	70.	75.	69.	13 2	20 7	59. 14.	.42	7.62	.29	3.17
MAR	71.	78.	69.	12 3	20 7	56. 15.	.47	8.45	.33	3.51
APR	72.	79.	70.	14 9	20 6	54. 30.	.45	8.20	.31	3.41
MAY	74.	78.	70.	9 11	20 6	54. 39.	.46	8.36	.33	3.48
JUN	76.	77.	70.	30 18	18 6	85. 59.	.45	8.20	.31	3.41
JUL	76.	77.	71.	15 10	18 6	92. 60.	.47	8.45	.33	3.51
AUG	76.	77.	70.	11 25	18 6	87. 51.	.46	8.36	.33	3.48
SEP	74.	80.	70.	16 15	20 6	55. 39.	.46	8.29	.31	3.45
OCT	72.	80.	70.	20 28	20 5	50. 31.	.46	8.36	.33	3.48
NOV	71.	80.	69.	17 3	20 7	56. 18.	.45	8.11	.31	3.38
DEC	70.	78.	69.	23 18	20 7	55. -1.	.47	8.54	.33	3.55
YEAR							5.47	99.28	3.83	41.31

BLDG 639 - Post Exchange Game room - Zone 2    BASERUN (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	714	0	0	0	-.4132E+05	.0000
FEB	610	0	0	0	-.3528E+05	.0000
MAR	586	24	0	0	-.3485E+05	.1985E+05
APR	336	111	0	0	-.2196E+05	.2275E+05
MAY	115	246	0	0	-.1475E+05	.2887E+05
JUN	5	465	0	0	-1888.	.3788E+05
JUL	0	604	0	0	.0000	.4140E+05
AUG	3	607	0	0	-4598.	.3861E+05
SEP	108	348	0	0	-.1320E+05	.3889E+05
OCT	352	91	0	0	-.1928E+05	.2312E+05
NOV	510	23	0	0	-.2872E+05	.1494E+05
DEC	698	0	5	0	-.4400E+05	.0000
YEAR	4037	2519	5	0	-.4400E+05	.4140E+05

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL	INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT	GAIN MILLION BTU	
JAN	18.32	.00	.46	8.36	.10	3.48	3.2	
FEB	14.79	.00	.42	7.62	.09	3.17	3.2	
MAR	12.62	.03	.47	8.45	.10	3.51	5.1	
APR	5.76	.13	.45	8.20	.09	3.41	5.3	
MAY	1.49	.31	.46	8.36	.10	3.48	5.7	
JUN	.05	.69	.45	8.20	.09	3.41	6.2	
JUL	.00	.96	.47	8.45	.10	3.51	6.3	
AUG	.03	.90	.46	8.36	.10	3.48	6.2	
SEP	1.48	.51	.46	8.29	.09	3.45	6.2	
OCT	5.53	.11	.46	8.36	.10	3.48	5.2	
NOV	10.11	.02	.45	8.11	.09	3.38	4.3	
DEC	17.82	.00	.47	8.54	.10	3.55	3.2	
YEAR	88.03	3.65	5.47	99.28	1.12	41.31	6.3	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 212481. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange Game room - Zone 2      BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL    HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0    0	.0000	-.4132E+05
FEB	1464.	929.	1.000	37.	0.	0.	0    0	.0000	-.3528E+05
MAR	1922.	1254.	1.000	43.	0.	0.	0    0	.1985E+05	-.3485E+05
APR	2312.	1600.	1.000	55.	0.	0.	0    0	.2275E+05	-.2196E+05
MAY	2566.	1826.	1.000	65.	0.	0.	0    0	.2887E+05	-.1475E+05
JUN	2647.	1993.	1.000	72.	0.	0.	0    0	.3788E+05	-1888.
JUL	2546.	2015.	1.000	77.	0.	0.	0    0	.4140E+05	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0    0	.3861E+05	-4598.
SEP	1856.	1371.	1.000	68.	0.	0.	0    0	.3889E+05	-.1320E+05
OCT	1437.	953.	1.000	57.	0.	0.	0    0	.2312E+05	-.1928E+05
NOV	1039.	732.	1.000	47.	0.	0.	0    0	.1494E+05	-.2872E+05
DEC	883.	604.	1.000	35.	0.	0.	0    5	.0000	-.4400E+05

BLDG 639 - Post Exchange Game room - Zone 2 NIGHT SETBACK (FT LEONARD WOOD,  
MO

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 9415.590000

FLOOR AREA (SQFT) 1046.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 44000.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -42000.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 44000.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 93.000000

## INFILTRATION PROFILE

.850	.850	.850	.850	.850	.850	.850	.850
.850	.850	.850	.850	.850	.850	.850	.850
1.00	1.00	1.00	1.00	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 5.930000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 5230.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 75.900000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 19.100000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	581.0	248.0	.0	239.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	27.0
WINDOW HEIGHT FT (WNDH)	.0	.0	.0	2.7
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.113	.113	.113	.113
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00416	.00416	.00416	.00416
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00001	.00001	.00001	.00001
N=2	.00058	.00058	.00058	.00058
N=3	.00229	.00229	.00229	.00229
N=4	.00119	.00119	.00119	.00119
N=5	.00009	.00009	.00009	.00009
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.71940	-1.71940	-1.71940	-1.71940
N=3	.84375	.84375	.84375	.84375
N=4	-.09022	-.09022	-.09022	-.09022
N=5	.00268	.00268	.00268	.00268
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	1046.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.500000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 76.0 76.0				
76.0 76.0 76.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 70.0 70.0				
70.0 70.0 70.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	- - - - -	BTU/HR	- - - - -		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	2.	1536.	2700.	2200.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	1.000	.000	.000	55.0	90.0	
2	.100	1.000	.000	.000	55.0	90.0	
3	.100	1.000	.000	.000	55.0	90.0	
4	.100	1.000	.000	.000	55.0	90.0	
5	.100	1.000	.000	.000	55.0	90.0	
6	.100	1.000	.000	.000	55.0	90.0	
7	.100	1.000	.000	.000	55.0	90.0	
8	.100	1.000	.000	.000	55.0	90.0	
9	.100	1.000	.000	.000	55.0	90.0	
10	.100	1.000	.000	.000	55.0	90.0	
11	.100	1.000	.000	.000	55.0	90.0	
12	.100	1.000	.000	.000	55.0	90.0	
13	.100	1.000	.000	.000	55.0	90.0	
14	.100	1.000	.000	.000	55.0	90.0	
15	.100	1.000	.000	.000	55.0	90.0	
16	.100	1.000	.000	.000	55.0	90.0	
17	1.000	1.000	.800	.800	55.0	90.0	
18	1.000	1.000	1.000	1.000	70.0	76.0	
19	1.000	1.000	1.000	1.000	70.0	76.0	
20	1.000	1.000	.800	.800	70.0	76.0	
21	.100	1.000	.000	.000	55.0	90.0	
22	.100	1.000	.000	.000	55.0	90.0	
23	.100	1.000	.000	.000	55.0	90.0	
24	.100	1.000	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					1000.000000		
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					44000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					55000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					3		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					42000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					10750.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				



BLDG 639 - Post Exchange Game room - Zone 2 NIGHT SETBACK (FT LEONARD WOOD,  
MO

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	.34	.01	.00	.00	.02	.00	.01	.00
	-7.44	LOSS		-2.48	-1.74	.00	-1.46	-.26	-5.40	.00
FEB	.00	GAIN	.46	.03	.00	.00	.08	.00	.01	.00
	-5.53	LOSS		-2.03	-1.46	.00	-1.02	-.22	-4.55	.00
MAR	.14	GAIN	.57	.11	.02	.00	.24	.00	.05	.02
	-3.90	LOSS		-1.86	-1.37	.00	-.75	-.20	-4.13	.00
APR	.88	GAIN	.60	.28	.04	.00	.45	.01	.11	.11
	-1.08	LOSS		-1.25	-.87	.00	-.35	-.13	-2.50	.00
MAY	2.22	GAIN	.67	.39	.04	.00	.63	.01	.09	.33
	-.02	LOSS		-.96	-.64	.00	-.15	-.09	-1.59	.00
JUN	3.95	GAIN	.68	.44	.04	.00	.76	.01	.08	.93
	.00	LOSS		-.72	-.45	.00	-.05	-.06	-1.08	.00
JUL	5.24	GAIN	.70	.54	.08	.00	.91	.01	.19	1.34
	.00	LOSS		-.66	-.38	.00	-.03	-.06	-.92	.00
AUG	4.51	GAIN	.61	.46	.07	.00	.81	.01	.16	1.03
	.00	LOSS		-.70	-.40	.00	-.04	-.06	-.95	.00
SEP	2.68	GAIN	.52	.32	.07	.00	.62	.01	.19	.64
	.00	LOSS		-.94	-.55	.00	-.15	-.08	-1.46	.00
OCT	.68	GAIN	.42	.16	.05	.00	.33	.01	.13	.13
	-.66	LOSS		-1.30	-.80	.00	-.38	-.12	-2.11	.00
NOV	.12	GAIN	.31	.06	.03	.00	.14	.00	.07	.03
	-2.83	LOSS		-1.68	-1.10	.00	-.73	-.16	-3.08	.00
DEC	.00	GAIN	.28	.01	.01	.00	.03	.00	.02	.00
	-7.20	LOSS		-2.48	-1.71	.00	-1.47	-.25	-5.16	.00
TOT	20.42	GAIN	6.17	2.80	.44	.00	5.01	.07	1.11	4.56
	-28.66	LOSS		-17.07	-11.46	.00	-6.60	-1.69	-32.93	.00

MAX HEATING LOAD= -44000. BTUH ON DEC 31 HOUR 18 AMBIENT TEMP 41.  
MAX COOLING LOAD= 42000. BTUH ON OCT 5 HOUR 18 AMBIENT TEMP 71.

ZONE UA BTU/HR-F 273.7

BEACON Energy Analysis By Energy Systems Engineers, Inc.

639B-2.I

BLDG 639 - Post Exchange Game room - Zone 2 NIGHT SETBACK (FT LEONARD WOOD,  
MO

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	59.	73.	54.	4 27	20 6	58. 4.	.46	8.36	.33	3.48
FEB	60.	75.	55.	25 2	20 7	47. 14.	.42	7.62	.29	3.17
MAR	62.	79.	55.	24 3	21 7	69. 15.	.47	8.45	.33	3.51
APR	68.	87.	55.	30 9	17 6	83. 30.	.45	8.20	.31	3.41
MAY	74.	90.	55.	29 11	17 7	85. 45.	.46	8.36	.33	3.48
JUN	79.	90.	70.	27 19	17 7	86. 64.	.45	8.20	.31	3.41
JUL	81.	90.	70.	26 10	17 6	93. 60.	.47	8.45	.33	3.51
AUG	80.	90.	68.	29 25	17 7	94. 55.	.46	8.36	.33	3.48
SEP	75.	90.	57.	10 15	17 7	86. 44.	.46	8.29	.31	3.45
OCT	67.	87.	55.	4 28	17 7	79. 34.	.46	8.36	.33	3.48
NOV	63.	80.	55.	8 3	17 7	72. 18.	.45	8.11	.31	3.38
DEC	59.	77.	54.	29 18	20 7	54. -1.	.47	8.54	.33	3.55
YEAR							5.47	99.28	3.83	41.31

BLDG 639 - Post Exchange Game room - Zone 2 NIGHT SETBACK (FT LEONARD WOOD,  
MO

NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED						
MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	510	0	30	0	-.4400E+05	.0000
FEB	384	0	25	0	-.4400E+05	.0000
MAR	310	10	18	0	-.4400E+05	.2129E+05
APR	109	49	7	3	-.4400E+05	.4200E+05
MAY	5	94	0	15	-.1157E+05	.4200E+05
JUN	0	129	0	46	.0000	.4200E+05
JUL	0	175	0	73	.0000	.4200E+05
AUG	0	139	0	64	.0000	.4200E+05
SEP	1	91	0	30	-282.7	.4200E+05
OCT	71	35	5	4	-.4400E+05	.4200E+05
NOV	262	11	15	0	-.4400E+05	.2817E+05
DEC	485	0	33	0	-.4400E+05	.0000
YEAR	2137	733	133	235	-.4400E+05	.4200E+05

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	11.29	.00	.46	8.36	.10	3.48	3.2
FEB	8.43	.00	.42	7.62	.09	3.17	3.2
MAR	6.25	.01	.47	8.45	.10	3.51	5.1
APR	1.92	.08	.45	8.20	.09	3.41	5.5
MAY	.06	.19	.46	8.36	.10	3.48	5.6
JUN	.00	.32	.45	8.20	.09	3.41	6.1
JUL	.00	.42	.47	8.45	.10	3.51	6.4
AUG	.00	.36	.46	8.36	.10	3.48	6.2
SEP	.01	.22	.46	8.29	.09	3.45	6.4
OCT	1.23	.06	.46	8.36	.10	3.48	5.5
NOV	4.79	.01	.45	8.11	.09	3.38	4.8
DEC	10.87	.00	.47	8.54	.10	3.55	3.2
YEAR	44.85	1.68	5.47	99.28	1.12	41.31	6.4

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 164767. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange Game room - Zone 2 NIGHT SETBACK (FT LEONARD WOOD,  
MO

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	30	.0000	-.4400E+05
FEB	1464.	929.	1.000	37.	0.	0.	0	25	.0000	-.4400E+05
MAR	1922.	1254.	1.000	43.	0.	0.	0	18	.2129E+05	-.4400E+05
APR	2312.	1600.	1.000	55.	0.	0.	3	7	.4200E+05	-.4400E+05
MAY	2566.	1826.	1.000	65.	0.	0.	15	0	.4200E+05	-.1157E+05
JUN	2647.	1993.	1.000	72.	0.	0.	46	0	.4200E+05	.0000
JUL	2546.	2015.	1.000	77.	0.	0.	73	0	.4200E+05	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	64	0	.4200E+05	.0000
SEP	1856.	1371.	1.000	68.	0.	0.	30	0	.4200E+05	-282.7
OCT	1437.	953.	1.000	57.	0.	0.	4	5	.4200E+05	-.4400E+05
NOV	1039.	732.	1.000	47.	0.	0.	0	15	.2817E+05	-.4400E+05
DEC	883.	604.	1.000	35.	0.	0.	0	33	.0000	-.4400E+05

BLDG 639 - Post Exchange Game room - Zone 2 DDC SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.375000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 9415.590000  
 FLOOR AREA (SQFT) 1046.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 44000.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -42000.000000  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 44000.000000  
 CONSTANT INFILTRATION RATE CFM (CFM1) 93.000000

## INFILTRATION PROFILE

.850	.850	.850	.850	.850	.850	.850	.850
.850	.850	.850	.850	.850	.850	.850	.850
1.00	1.00	1.00	1.00	.850	.850	.850	.850

A FACTOR IN INFILTRATION EQUATION (CINA) 5.930000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 5230.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 75.900000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 19.100000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	581.0	248.0	.0	239.0
WINDOW AREA SQFT (AWND)	.0	.0	.0	27.0
WINDOW HEIGHT FT (WNDH)	.0	.0	.0	2.7
WINDOW WIDTH FT (WNDW)	.0	.0	.0	10.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0
MAX SOLAR WITH NO SHADE (SOLMX)	120.0	120.0	120.0	120.0

U VALUE BTU/(HR-SQFT-F) (UW)	.113	.113	.113	.113
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00416	.00416	.00416	.00416
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00001	.00001	.00001	.00001
N=2	.00058	.00058	.00058	.00058
N=3	.00229	.00229	.00229	.00229
N=4	.00119	.00119	.00119	.00119
N=5	.00009	.00009	.00009	.00009
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.71940	-1.71940	-1.71940	-1.71940
N=3	.84375	.84375	.84375	.84375
N=4	-.09022	-.09022	-.09022	-.09022
N=5	.00268	.00268	.00268	.00268
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	1046.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.120000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	5.429566E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.304E-02 .314E-01 .190E-01 .852E-03 .122E+04 .122E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.500000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 78.0 78.0				
78.0 78.0 78.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 68.0 68.0				
68.0 68.0 68.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
KW	BTU/HR					
	PEOPLE					
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	2.	1536.	2700.	2200.		

HOUR	HOURLY FRACTION OF PEAK							
1	.100	1.000	.000	.000	55.0	90.0		
2	.100	1.000	.000	.000	55.0	90.0		
3	.100	1.000	.000	.000	55.0	90.0		
4	.100	1.000	.000	.000	55.0	90.0		
5	.100	1.000	.000	.000	55.0	90.0		
6	.100	1.000	.000	.000	55.0	90.0		
7	.100	1.000	.000	.000	55.0	90.0		
8	.100	1.000	.000	.000	55.0	90.0		
9	.100	1.000	.000	.000	55.0	90.0		
10	.100	1.000	.000	.000	55.0	90.0		
11	.100	1.000	.000	.000	55.0	90.0		
12	.100	1.000	.000	.000	55.0	90.0		
13	.100	1.000	.000	.000	55.0	90.0		
14	.100	1.000	.000	.000	55.0	90.0		
15	.100	1.000	.000	.000	55.0	90.0		
16	.100	1.000	.000	.000	55.0	90.0		
17	1.000	1.000	.800	.800	55.0	90.0		
18	1.000	1.000	1.000	1.000	68.0	78.0		
19	1.000	1.000	1.000	1.000	68.0	78.0		
20	1.000	1.000	.800	.800	68.0	78.0		
21	.100	1.000	.000	.000	55.0	90.0		
22	.100	1.000	.000	.000	55.0	90.0		
23	.100	1.000	.000	.000	55.0	90.0		
24	.100	1.000	.000	.000	55.0	90.0		
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000			
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					60.000000			
SYSTEM TYPE, (IECN)					2			
SUPPLY AIR CFM (SACFM)					1000.000000			
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00			
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00			
SYSTEM SUPPLY AIR STOP TIME HR					24.000000			
SYSTEM MIXED AIR TEMP(TMXAIR)					65.000000			
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00			
FAN EFFICIENCY (EFAN)					5.500000E-01			
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01			
HEATING PLANT RATED OUTPUT BTU (HFL0T)					44000.000000			
HEATING PLANT RATED INPUT BTU (HFLIN)					55000.000000			
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)								
.100	.191	.200	.286	.300	.369	.400	.451	
.500	.537	.600	.625	.700	.718	.800	.812	
.900	.906	1.00	1.00					
CHILLER TYPE (ITYPCH)					3			
COOLING PLANT RATED OUTPUT BTU (CFLOT)					42000.000000			
COOLING PLANT RATED INPUT BTU (CFLIN)					10750.000000			
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)								
.000	.000	.000	.000	.000	.000	.000	.000	
.000	.000	.000	.000	.000	.000	.000	.000	
.000	.000	.000	.000					



BLDG 639 - Post Exchange Game room - Zone 2 DDC SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	.34	.01	.00	.00	.03	.00	.01	.00
	-7.20	LOSS		-2.44	-1.70	.00	-1.42	-.25	-5.28	.00
FEB	.00	GAIN	.46	.03	.00	.00	.08	.00	.01	.00
	-5.29	LOSS		-1.99	-1.43	.00	-.98	-.21	-4.44	.00
MAR	.07	GAIN	.57	.11	.02	.00	.24	.00	.05	.01
	-3.70	LOSS		-1.84	-1.35	.00	-.72	-.20	-4.06	.00
APR	.70	GAIN	.60	.28	.04	.00	.43	.01	.11	.10
	-.98	LOSS		-1.26	-.88	.00	-.35	-.13	-2.53	.00
MAY	1.93	GAIN	.67	.38	.03	.00	.60	.01	.08	.32
	-.01	LOSS		-1.01	-.67	.00	-.17	-.10	-1.69	.00
JUN	3.66	GAIN	.68	.43	.03	.00	.72	.00	.07	.93
	.00	LOSS		-.77	-.49	.00	-.07	-.07	-1.18	.00
JUL	5.03	GAIN	.70	.53	.07	.00	.87	.01	.17	1.33
	.00	LOSS		-.69	-.40	.00	-.04	-.06	-.99	.00
AUG	4.31	GAIN	.61	.45	.06	.00	.78	.01	.14	1.04
	.00	LOSS		-.73	-.42	.00	-.05	-.06	-1.01	.00
SEP	2.43	GAIN	.52	.31	.07	.00	.58	.01	.17	.63
	.00	LOSS		-.98	-.58	.00	-.17	-.09	-1.55	.00
OCT	.54	GAIN	.42	.16	.05	.00	.33	.01	.13	.11
	-.56	LOSS		-1.31	-.81	.00	-.38	-.12	-2.12	.00
NOV	.06	GAIN	.31	.06	.03	.00	.15	.00	.07	.02
	-2.63	LOSS		-1.65	-1.08	.00	-.70	-.16	-3.01	.00
DEC	.00	GAIN	.28	.01	.01	.00	.03	.00	.02	.00
	-6.97	LOSS		-2.44	-1.67	.00	-1.43	-.25	-5.05	.00
TOT	18.73	GAIN	6.17	2.74	.41	.00	4.83	.06	1.02	4.49
	-27.32	LOSS		-17.10	-11.49	.00	-6.51	-1.70	-32.90	.00

MAX HEATING LOAD= -44000. BTUH ON DEC 31 HOUR 18      AMBIENT TEMP 41.  
 MAX COOLING LOAD= 42000. BTUH ON OCT 5 HOUR 18      AMBIENT TEMP 71.

ZONE UA BTU/HR-F

273.7

BEACON Energy Analysis By Energy Systems Engineers, Inc.

639B-1.I

BLDG 639 - Post Exchange Game room - Zone 2 DDC SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	59.	73.	54.	4 27	20 6	58. 4.	.46	8.36	.33	3.48
FEB	59.	74.	55.	25 2	20 7	47. 14.	.42	7.62	.29	3.17
MAR	62.	81.	55.	24 3	20 7	69. 15.	.47	8.45	.33	3.51
APR	68.	87.	55.	30 9	17 6	83. 30.	.45	8.20	.31	3.41
MAY	74.	90.	55.	29 11	17 7	85. 45.	.46	8.36	.33	3.48
JUN	79.	90.	70.	27 19	17 7	86. 64.	.45	8.20	.31	3.41
JUL	82.	90.	71.	26 10	17 7	93. 65.	.47	8.45	.33	3.51
AUG	81.	90.	69.	29 25	17 8	94. 60.	.46	8.36	.33	3.48
SEP	76.	90.	57.	10 15	17 7	86. 44.	.46	8.29	.31	3.45
OCT	68.	87.	55.	4 28	17 7	79. 34.	.46	8.36	.33	3.48
NOV	63.	80.	55.	8 3	17 7	72. 18.	.45	8.11	.31	3.38
DEC	59.	76.	54.	29 18	20 7	54. -1.	.47	8.54	.33	3.55
YEAR							5.47	99.28	3.83	41.31

BLDG 639 - Post Exchange Game room - Zone 2 DDC SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	514	0	27	0	-.4400E+05	.0000
FEB	389	0	18	0	-.4400E+05	.0000
MAR	310	7	13	0	-.4400E+05	.1454E+05
APR	110	41	3	2	-.4400E+05	.4200E+05
MAY	5	90	0	10	-2789.	.4200E+05
JUN	0	129	0	38	.0000	.4200E+05
JUL	0	174	0	61	.0000	.4200E+05
AUG	0	138	0	55	.0000	.4200E+05
SEP	0	88	0	19	.0000	.4200E+05
OCT	69	31	2	2	-.4400E+05	.4200E+05
NOV	258	5	11	0	-.4400E+05	.1961E+05
DEC	492	0	28	0	-.4400E+05	.0000
YEAR	2147	703	102	187	-.4400E+05	.4200E+05

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	11.02	.00	.46	8.36	.10	3.48	3.2
FEB	8.21	.00	.42	7.62	.09	3.17	3.2
MAR	6.02	.01	.47	8.45	.10	3.51	4.7
APR	1.82	.07	.45	8.20	.09	3.41	5.5
MAY	.05	.17	.46	8.36	.10	3.48	5.6
JUN	.00	.30	.45	8.20	.09	3.41	6.1
JUL	.00	.41	.47	8.45	.10	3.51	6.3
AUG	.00	.35	.46	8.36	.10	3.48	6.1
SEP	.00	.20	.46	8.29	.09	3.45	6.1
OCT	1.09	.05	.46	8.36	.10	3.48	5.5
NOV	4.53	.01	.45	8.11	.09	3.38	4.2
DEC	10.65	.00	.47	8.54	.10	3.55	3.2
YEAR	43.40	1.56	5.47	99.28	1.12	41.31	6.3

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 162987. BTU/(SQFT-YEAR)

BLDG 639 - Post Exchange Game room - Zone 2 DDC SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	27	.0000	-.4400E+05
FEB	1464.	929.	1.000	37.	0.	0.	0	18	.0000	-.4400E+05
MAR	1922.	1254.	1.000	43.	0.	0.	0	13	.1454E+05	-.4400E+05
APR	2312.	1600.	1.000	55.	0.	0.	2	3	.4200E+05	-.4400E+05
MAY	2566.	1826.	1.000	65.	0.	0.	10	0	.4200E+05	-2789.
JUN	2647.	1993.	1.000	72.	0.	0.	38	0	.4200E+05	.0000
JUL	2546.	2015.	1.000	77.	0.	0.	61	0	.4200E+05	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	55	0	.4200E+05	.0000
SEP	1856.	1371.	1.000	68.	0.	0.	19	0	.4200E+05	.0000
OCT	1437.	953.	1.000	57.	0.	0.	2	2	.4200E+05	-.4400E+05
NOV	1039.	732.	1.000	47.	0.	0.	0	11	.1961E+05	-.4400E+05
DEC	883.	604.	1.000	35.	0.	0.	0	28	.0000	-.4400E+05

**COMPUTER SIMULATIONS**

BUILDING 651

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 651  
BLDG. TYPE: BARRACKS

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	3338.9	3049.1	2765.5	2765.5		2945.4
COOLING (KWH)	55060	55060	49800	49590		48350

SUPPLY AIR FAN	27148 CFM
FLOOR AREA	40986 FT <sup>2</sup>
CFMi	3167 CFM
UA	9330 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 4368 = 0 HR/YR  
 HOUR SAVE (COOLING ONLY) 2928 - 2928 = 0 HR/YR

HOAUHC	3338.9 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	3167 CFM *	0 HR/YR		
HOAUH	3338.9 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	3167 CFM *	0 HR/YR		
COAUHC	55060 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	3167 CFM *	0 HR/YR		
COAUC	55060 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	3167 CFM *	0 HR/YR		
HOAOHC	3338.9 MBtu -	2945.4 MBtu	=	1.42E+01 Btu/CFM-HR
	3167 CFM *	8760 HR/YR		
HOAOH	3338.9 MBtu -	2945.4 MBtu	=	2.84E+01 Btu/CFM-HR
	3167 CFM *	4368 HR/YR		
COAOHC	55060 KWH -	48350 KWH	=	2.42E-04 KWH/CFM-HR
	3167 CFM *	8760 HR/YR		
COAOC	55060 KWH -	48350 KWH	=	7.24E-04 KWH/CFM-HR
	3167 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 05-Mar-93  
BUILDING NO.: 651  
BLDG. TYPE: BARRACKS

**ENERGY CONSTANT CALCULATIONS**

ECO	49800 KWH -	49590 KWH	=	2.64E-06 KWH/CFM-HR
	27148 CFM *	2928 HR/YR		
ECHO	49800 KWH -	49590 KWH	=	8.83E-07 KWH/CFM-HR
	27148 CFM *	8760 HR/YR		
NSUCHO	55060 KWH -	55060 KWH	=	0.00E+00 KWH/CFM-HR
	27148 CFM *	0 HR/YR		
NSUCC	55060 KWH -	55060 KWH	=	0.00E+00 KWH/CFM-HR
	27148 CFM *	0 HR/YR		
DDCCHO	55060 KWH -	49800 KWH	=	2.21E-05 KWH/CFM-HR
	27148 CFM *	8760 HR/YR		
DDCCO	55060 KWH -	49800 KWH	=	6.62E-05 KWH/CFM-HR
	27148 CFM *	2928 HR/YR		
NSC	3338.9 MBtu -	3049.1 MBtu	=	3.11E+04 Btu/UA
	9330 UA			
DSC	3049.1 MBtu -	2765.5 MBtu	=	3.04E+04 Btu/UA
	9330 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	0 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR



**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 03-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 651BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 651 BLDG NAME: BARRACKS

BLDG FUNCTION:

FLOOR AREA: (SQ. FT)

40,986

# FLOORS 3

SLAB PERIMETER: (FT)

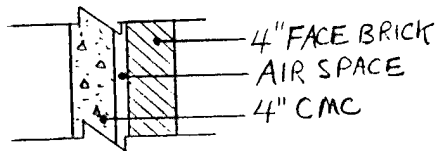
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## I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	9,088	9,088	1,845	1,845	21,866
GLASS	(SQ. FT)	467	435	17	19	938
PERSONNEL DOOR	(SQ. FT)	80	40	0	0	120
INSULATED PANEL	(SQ. FT)	233	217	9	9	468
WALLS, NET	(SQ. FT)	8,308	8,396	1,819	1,817	20,341
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					13,662
INSULATED PANEL	(SQ. FT)	468				120
PERSONNEL DOOR	(SQ. FT)					
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

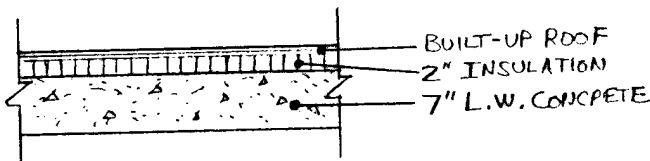
## II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 4" CMU / 9" L.W. CONC.	3.00
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.19
U=1/R	0.193

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" INSULATION	6.68
4. 7" L.W. CONCRETE	6.25
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.12
U=1/R	0.071

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

## III. INFILTRATION:

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.042	=	0
AVG. WALL H/M/L (SQ.FT.)	H	21866	X CFM / SQ.FT.	0.138	= 3,018
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	50	X CFM / OPENING /HR	1.600	=	80
DOOR OPENINGS / HR - DOUBLE DOORS	50	X CFM / OPENING /HR	1.385	=	69
		TOTAL INFILTRATION (CFM)		=	3167

UA PANEL	= PANEL AREA	468	X PANEL "U"	0.238	=	111
UA PDOOR	= PDOOR AREA	120	X DOOR "U"	0.391	=	47
UA WALL	= WALL AREA	19,873	X WALL "U"	0.193	=	3,917
UA ROOF	= ROOF AREA	13,662	X ROOF "U"	0.071	=	968
UA GLASS	= GLASS AREA	938	X GLASS "U"	0.621	=	582
UA SLAB	= SLAB PERIM.	514	X SLF	0.830	=	427
UA BASEM.	= B-WALL AREA	0	X BASE "U"	0.000	=	0
INFILTRATION	= CFM	3167	X A. T. F.	1.035	=	3,278
			TOTAL UA (BTU/HR°F)			9,330

**E M C Engineers, Inc.**  
PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
DATE: 03-Feb-93  
PREPARED BY:  
CHECKED BY:  
FILE: CEL 651ZN1  
BLDG: 651

**ZONE:**

Rates of Heat Gain from Occupants of Conditioned Spaces								
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
1	374	1	Seated at rest	Theater, Movie	225	105	84,150	39,270
TOTAL	374					TOTAL	84,150	39,270

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	18	5	Fluorescent, 1 – 34w lamp, 16w ballast (1x4 ft. fixture)	50	900
	76	6	Fluorescent, 2 – 34w lamps, 16w ballast (2x4 ft. fixture)	84	6,384
	64	8	Fluorescent, 4 – 34w lamps, 2 – 16w ballasts (2x4 ft. fix.)	168	10,752
	102	18	Incandescent – 60w	60	6,120
TOTAL	260			TOTAL	24,156

<b>Peak Value for Internal Gains</b>						
<b>Zone No.</b>	<b>No. of Equipment</b>	<b>Equip. Type</b>	<b>Description</b>	<b>Average Wattage</b>	<b>Heat Gain to Space(%)</b>	<b>Total (BTU)</b>
1	6	68	Washing Machine (Automatic)	512	20%	10,485
	6	23	Clothes Dryer	4,856	45%	99,441
				TOTAL	43%	109,926

Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
1	6	68	Washing Machine (Automatic)	512	20%	3,072	10,485
	6	23	Clothes Dryer	4,856	45%	29,136	99,441
			TOTAL		43%	32,208	109,926

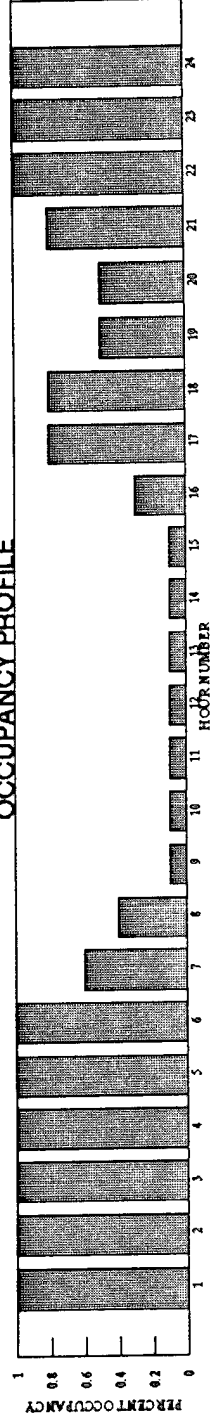
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

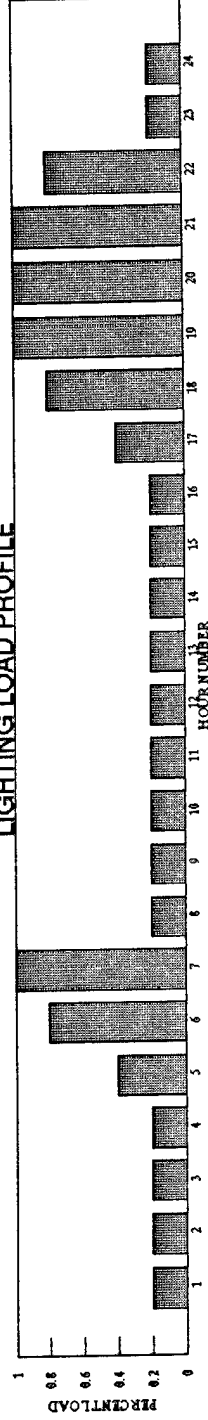
EMC NO.: 3204 -000  
 DATE: 03 -Feb-93  
 PREPARED BY: CEL  
 CHECKED BY: 651ZN1  
 FILE: 651  
 BLDG: 651  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Barracks	OCCUPANCY	1	1	1	1	1	1	0.6	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.8	0.8	0.5	0.5	0.8	1	1	1
		LIGHTING	0.2	0.2	0.2	0.2	0.4	0.8	1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.8	1	1	1	0.8	0.2	0.2
		PROCESS																	0.3	0.3	0.3	0.3	0.3			

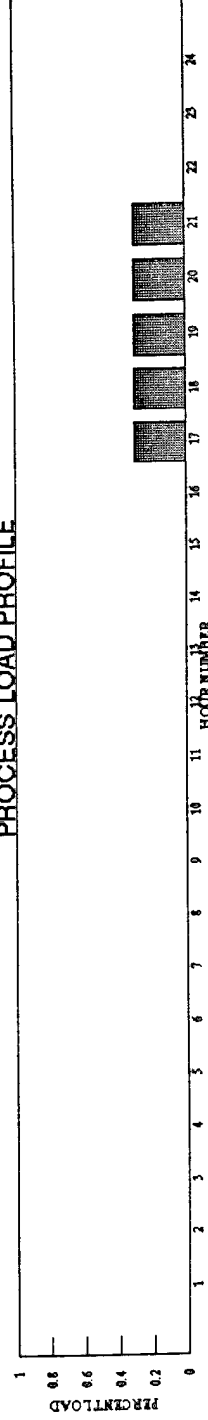
OCCUPANCY PROFILE



LIGHTING LOAD PROFILE



PROCESS LOAD PROFILE



BLDG 651 - BARRACKS WITH A/C - BASERUN (FT LEONARD WOOD, MO)

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----- PROGRAM CONTROL OPTIONS -----
COOLING ON WEEKEND (1=YES, 0=NO) (ICWK)          1
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC)       0
WEEKEND INTERNAL GAINS FACTOR (WKEND)          1.000000
LAST CASE FLAG (1=YES, 0=NO) (LSTCS)           1
SKY CLEARNESS FACTOR (CLN)          9.700000E-01
NUMBER OF ZONES (NZ)          1
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW)        0
----- SITE AND BUILDING DATA -----

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\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 437184.000000

FLOOR AREA (SQFT) 40986.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1664120.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -891200.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 409860.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 3167.000000

INFILTRATION PROFILE

.670	.670	.670	.670	.670	.670	.670	.670
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.670	.670	.670	.670	.670	.670

A FACTOR IN INFILTRATION EQUATION (CINA) 4.350000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 231200.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 0.000000E+00

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 47.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	8613.0	1828.0	8541.0	1826.0
WINDOW AREA SQFT (AWND)	435.0	18.5	467.0	17.2
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	43.5	1.9	46.7	1.7
WIDTH OF OVERHANG (WOH)	2.5	2.5	2.5	2.5
OVERHANG HGT ABV WNDW(HOH)	1.0	1.0	1.0	1.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
		24.	47268.	84150.	39270.		
		HOURLY FRACTION OF PEAK					
1		.200	.000	1.000	1.000	72.0	76.0
2		.200	.000	1.000	1.000	72.0	76.0
3		.200	.000	1.000	1.000	72.0	76.0
4		.200	.000	1.000	1.000	72.0	76.0
5		.400	.000	1.000	1.000	72.0	76.0
6		.800	.000	1.000	1.000	72.0	76.0
7		1.000	.000	.800	.800	72.0	76.0
8		.200	.000	.400	.400	72.0	76.0
9		.200	.000	.100	.100	72.0	76.0
10		.200	.000	.100	.100	72.0	76.0
11		.200	.000	.100	.100	72.0	76.0
12		.200	.000	.100	.100	72.0	76.0

13	.200	.000	.100	.100	72.0	76.0
14	.200	.000	.100	.100	72.0	76.0
15	.200	.000	.100	.100	72.0	76.0
16	.400	.000	.300	.300	72.0	76.0
17	.800	.300	.800	.800	72.0	76.0
18	1.000	.300	.800	.800	72.0	76.0
19	1.000	.300	.500	.500	72.0	76.0
20	1.000	.300	.500	.500	72.0	76.0
21	1.000	.300	.800	.800	72.0	76.0
22	.800	.000	1.000	1.000	72.0	76.0
23	.200	.000	1.000	1.000	72.0	76.0
24	.200	.000	1.000	1.000	72.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					68.000000	
SYSTEM TYPE, (IECN) 9						
SUPPLY AIR CFM (SACFM) 27148.000000						
ECONOMIZER HIGH TEMP LIMIT F 65.000000						
SYSTEM SUPPLY AIR START TIME HR 0.000000E+00						
SYSTEM SUPPLY AIR STOP TIME HR 24.000000						
SYSTEM MIXED AIR TEMP(TMXAIR) 55.000000						
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR) 1.000000E-01						
FAN EFFICIENCY (EFAN) 5.500000E-01						
FAN TOTAL PRESSURE IN. WATER (DP) 8.000000E-01						
VAV TYPE (IVAV) 1						
VAV MINIMUM SUPPLY AIR FRACTION (ARMIN) 2.500000E-01						
VAV COLD DECK TEMPERATURE F (TCD) 58.000000						
VAV FAN PART LOAD FACTORS						
.000	.560	.200	.560	.300	.620	.400 .700
.500	.770	.600	.830	.700	.880	.800 .930
.900	.980	1.00	1.00			
HEATING PLANT RATED OUTPUT BTU (HFLOT) 1700000.000000						
HEATING PLANT RATED INPUT BTU (HFLIN) 2125000.000000						
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH) 0						
COOLING PLANT RATED OUTPUT BTU (CFLOT) 892000.000000						
COOLING PLANT RATED INPUT BTU (CFLIN) 164905.000000						
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 651 - BARRACKS WITH A/C - BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -477.	GAIN LOSS	13.	0. -30.	0. -1.	0. 0.	0. -95.	0. -14.	0. -443.	0. 0.
FEB	0. -392.	GAIN LOSS	16.	0. -26.	0. -1.	0. 0.	0. -73.	0. -12.	0. -380.	0. 0.
MAR	1. -326.	GAIN LOSS	20.	0. -22.	0. -1.	0. 0.	3. -59.	0. -11.	0. -347.	1. 0.
APR	19. -142.	GAIN LOSS	20.	0. -14.	0. -1.	0. 0.	11. -30.	0. -7.	2. -203.	7. 0.
MAY	64. -27.	GAIN LOSS	22.	0. -6.	0. 0.	0. 0.	20. -12.	0. -4.	4. -111.	26. 0.
JUN	220. 0.	GAIN LOSS	23.	1. -2.	0. 0.	0. 0.	31. -4.	1. -2.	13. -45.	124. 0.
JUL	330. 0.	GAIN LOSS	23.	3. -1.	0. 0.	0. 0.	42. -2.	2. -1.	34. -25.	175. 0.
AUG	301. 0.	GAIN LOSS	20.	2. -1.	0. 0.	0. 0.	36. -2.	1. -1.	24. -27.	169. 0.
SEP	168. -33.	GAIN LOSS	17.	0. -5.	0. 0.	0. 0.	21. -11.	1. -3.	14. -84.	97. 0.
OCT	24. -131.	GAIN LOSS	15.	0. -14.	0. -1.	0. 0.	6. -31.	0. -6.	2. -184.	12. 0.
NOV	2. -246.	GAIN LOSS	12.	0. -20.	0. -1.	0. 0.	2. -55.	0. -9.	0. -271.	1. 0.
DEC	0. -467.	GAIN LOSS	12.	0. -31.	0. -1.	0. 0.	0. -96.	0. -14.	0. -427.	0. 0.
TOT	1129. -2243.	GAIN LOSS	215.	6. -169.	0. -8.	0. 0.	173. -470.	4. -84.	92. -2547.	612. 0.

MAX HEATING LOAD= -1454453. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 891200. BTUH ON SEP 2 HOUR 18      AMBIENT TEMP 86.

ZONE UA BTU/HR-F 5633.3

BLDG 651 - BARRACKS WITH A/C - BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	72.	73.	72.	4 31	18 24	61. 33.	8.24	5.11	2.94	71.34
FEB	72.	76.	72.	9 28	24 24	66. 34.	7.44	4.62	2.65	64.44
MAR	72.	77.	72.	24 28	23 10	68. 68.	8.24	5.11	2.94	71.34
APR	73.	77.	72.	6 2	22 12	65. 69.	7.97	4.95	3.15	69.35
MAY	75.	78.	72.	21 24	1 10	65. 61.	8.24	5.11	3.87	72.27
JUN	76.	79.	72.	3 17	22 7	65. 61.	7.97	4.95	5.16	71.36
JUL	76.	78.	74.	28 10	18 5	90. 57.	8.24	5.11	5.70	74.10
AUG	76.	77.	72.	16 25	15 9	72. 63.	8.24	5.11	4.95	73.35
SEP	75.	79.	72.	4 17	7 10	67. 68.	7.97	4.95	4.15	70.35
OCT	73.	77.	72.	1 12	22 13	65. 70.	8.24	5.11	3.50	71.91
NOV	72.	77.	72.	7 21	22 15	67. 68.	7.97	4.95	3.05	69.24
DEC	72.	72.	72.	31 23	24 15	42. 70.	8.24	5.11	2.94	71.34
YEAR							97.00	60.18	45.01	850.39



BLDG 651 - BARRACKS WITH A/C - BASERUN (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	735	744	0	0	-.1291E+07	.0000
FEB	655	672	0	0	-.1223E+07	.0000
MAR	652	744	1	0	-.1271E+07	.2934E+06
APR	403	720	3	0	-.7621E+06	.3959E+06
MAY	141	744	0	0	-.4283E+06	.5982E+06
JUN	0	720	0	1	.0000	.8912E+06
JUL	0	744	0	32	.0000	.8912E+06
AUG	5	744	0	1	-.1491E+06	.8912E+06
SEP	160	720	3	4	-.3828E+06	.8912E+06
OCT	446	744	6	0	-.6245E+06	.5088E+06
NOV	601	720	4	0	-.9122E+06	.2689E+06
DEC	744	744	3	0	-.1454E+07	.0000
YEAR	4542	8760	20	38	-.1454E+07	.8912E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	684.72	.00	8.24	5.11	2.03	71.34	26.9
FEB	574.36	.00	7.44	4.62	1.84	64.44	26.9
MAR	502.67	.08	8.24	5.11	2.03	71.34	42.5
APR	249.35	1.09	7.97	4.95	2.02	69.35	46.3
MAY	63.23	3.42	8.24	5.11	2.20	72.27	58.0
JUN	.00	11.12	7.97	4.95	2.39	71.36	76.6
JUL	.00	16.89	8.24	5.11	2.55	74.10	77.1
AUG	1.62	15.18	8.24	5.11	2.42	73.35	76.7
SEP	74.74	8.45	7.97	4.95	2.21	70.35	76.9
OCT	246.77	1.31	8.24	5.11	2.13	71.91	52.5
NOV	404.71	.11	7.97	4.95	2.00	69.24	40.2
DEC	676.28	.00	8.24	5.11	2.03	71.34	26.9
YEAR	3478.46	57.64	97.00	60.18	25.86	850.39	77.1

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 101369. BTU/(SQFT-YEAR)

BLDG 651 - BARRACKS WITH A/C - BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS SYSTEM NOT COOL	WHEN LOADS MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1291E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1223E+07
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2934E+06	-.1271E+07
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3959E+06	-.7621E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.5982E+06	-.4283E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.8912E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8912E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.8912E+06	-.1491E+06
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8912E+06	-.3828E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.5088E+06	-.6245E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2689E+06	-.9122E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1454E+07

BLDG 651 - BARRACKS WITH A/C - NIGHT SETBACK (FT LEONARD WOOD, MO)

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----- PROGRAM CONTROL OPTIONS -----
COOLING ON WEEKEND (1=YES, 0=NO) (ICWK)          3
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC)      0
WEEKEND INTERNAL GAINS FACTOR (WKEND)          1.000000
LAST CASE FLAG (1=YES, 0=NO) (LSTCS)           1
SKY CLEARNESS FACTOR (CLN)          9.700000E-01
NUMBER OF ZONES (NZ)          1
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW)        0

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----- SITE AND BUILDING DATA -----
*****REAL WEATHER FROM DISK*****

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FILE NAME MO
STATION 13995   YEAR 1955
SITE LATITUDE DEG (AL1)          37.750000
ELEVATION ABOVE SEA LEVEL IN FEET (ELEV)      1158.000000
MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB)      56.000000
AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN)  20.000000
SOLAR ABSORBTIVITY OF WALLS (ALPHA)          6.800000E-01
SOLAR ABSORBTIVITY OF ROOF (ALFRF)           3.500000E-01
SOLAR REFLECTANCE OF GROUND (RHOG)           2.000000E-01
INITIAL TEMP OF AIR IN BUILDING DEG F (TAO)    70.000000
INITIAL TEMPERATURE OF BUILDING MASS (TO)      70.000000
INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS)     9.000000E-03
INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW)     0.000000E+00
VOLUME OF ZONE IN CUBIC FEET (VOLHS)          437184.000000
FLOOR AREA (SQFT)          40986.000000
HEATING COIL MAX HEATING RATE BTU/HR (QHMAX)  1664120.000000
COOLING COIL MAX COOLING RATE BTU/HR (QCMAX)  -891200.000000
COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA)  409860.000000
CONSTANT INFILTRATION RATE CFM (CFMI)         3167.000000
INFILTRATION PROFILE
.670      .670      .670      .670      .670      .670      .670      .670
1.00      1.00      1.00      1.00      1.00      1.00      1.00      1.00
1.00      1.00      .670      .670      .670      .670      .670      .670
A FACTOR IN INFILTRATION EQUATION (CINA)      4.350000E-01
B FACTOR IN INFILTRATION EQUATION (CINB)      2.165000E-02
C FACTOR IN INFILTRATION EQUATION (CINC)      8.330000E-03
BUILDING THERMAL MASS MCP BTU/F (CMCP)        231200.000000
BASEMENT UA FACTOR BTU/HR-F (BSNF)           0.000000E+00
SLAB ON GRADE FACTOR BTU/HR-F (SLBF)         0.000000E+00
PARTITION UA BTU/HR-F (GUA)                   0.000000E+00
DOOR UA BTU/HR-F (DUA)          47.000000
WINDOW GLASS NUMBER (NG)          30
DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO)       6.930472E-01
NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN)      6.930472E-01
WINDOW SHADING FACTOR (SHD)          5.900000E-01

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WALL DATA
WALL NUMBER          1          2          3          4
AZIMUTH ANGLE (AZ)          .00        90.00       180.00      -90.00
WALL AREA SQFT (AWLL)      8613.0       1828.0      8541.0      1826.0
WINDOW AREA SQFT (AWND)     435.0        18.5       467.0       17.2
WINDOW HEIGHT FT (WNDH)     10.0         10.0       10.0        10.0
WINDOW WIDTH FT (WNDW)      43.5         1.9        46.7        1.7
WIDTH OF OVERHANG (WOH)      2.5          2.5        2.5         2.5
OVERHANG HGT ABV WNDW (HOH)  1.0          1.0        1.0         1.0

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MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	
WEEKEND COOLING THERMOSTAT PROFILE				
76.0	76.0	76.0	76.0	76.0
76.0	76.0	76.0	76.0	76.0
76.0	76.0	76.0	76.0	76.0
WEEKEND HEATING THERMOSTAT PROFILE				
70.0	70.0	70.0	70.0	70.0
70.0	70.0	70.0	70.0	70.0
70.0	70.0	70.0	70.0	70.0

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	-----	BTU/HR	-----		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	24.	47268.	84150.	39270.			
HOUR	HOURLY FRACTION OF PEAK						
1	.200	.000	1.000	1.000	70.0	76.0	
2	.200	.000	1.000	1.000	70.0	76.0	
3	.200	.000	1.000	1.000	70.0	76.0	
4	.200	.000	1.000	1.000	70.0	76.0	
5	.400	.000	1.000	1.000	70.0	76.0	
6	.800	.000	1.000	1.000	70.0	76.0	
7	1.000	.000	.800	.800	70.0	76.0	
8	.200	.000	.400	.400	70.0	76.0	
9	.200	.000	.100	.100	70.0	76.0	
10	.200	.000	.100	.100	70.0	76.0	
11	.200	.000	.100	.100	70.0	76.0	
12	.200	.000	.100	.100	70.0	76.0	
13	.200	.000	.100	.100	70.0	76.0	
14	.200	.000	.100	.100	70.0	76.0	
15	.200	.000	.100	.100	70.0	76.0	
16	.400	.000	.300	.300	70.0	76.0	
17	.800	.300	.800	.800	70.0	76.0	
18	1.000	.300	.800	.800	70.0	76.0	
19	1.000	.300	.500	.500	70.0	76.0	
20	1.000	.300	.500	.500	70.0	76.0	
21	1.000	.300	.800	.800	70.0	76.0	
22	.800	.000	1.000	1.000	70.0	76.0	
23	.200	.000	1.000	1.000	70.0	76.0	
24	.200	.000	1.000	1.000	70.0	76.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					68.000000		
SYSTEM TYPE, (IECN)					9		
SUPPLY AIR CFM (SACFM)					27148.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01		
VAV TYPE (IVAV)					1		
VAV MINIMUM SUPPLY AIR FRACTION (ARMIN)					2.500000E-01		
VAV COLD DECK TEMPERATURE F (TCD)					58.000000		
VAV FAN PART LOAD FACTORS							
.000	.560	.200	.560	.300	.620	.400	.700
.500	.770	.600	.830	.700	.880	.800	.930
.900	.980	1.00	1.00				
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1700000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					2125000.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					892000.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					164905.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400	.370
.500	.450	.600	.550	.700	.650	.800	.760
.900	.880	1.00	1.00				

BLDG 651 - BARRACKS WITH A/C - NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	13.	0.	0.	0.	0.	0.	0.	0.
	-435.	LOSS		-28.	-1.	0.	-89.	-14.	-410.	0.
FEB	0.	GAIN	16.	0.	0.	0.	0.	0.	0.	0.
	-355.	LOSS		-25.	-1.	0.	-67.	-11.	-350.	0.
MAR	1.	GAIN	20.	0.	0.	0.	4.	0.	0.	0.
	-288.	LOSS		-21.	-1.	0.	-54.	-10.	-318.	0.
APR	18.	GAIN	20.	0.	0.	0.	12.	0.	3.	7.
	-118.	LOSS		-13.	-1.	0.	-27.	-6.	-185.	0.
MAY	63.	GAIN	22.	0.	0.	0.	21.	0.	5.	26.
	-18.	LOSS		-6.	0.	0.	-11.	-3.	-105.	0.
JUN	220.	GAIN	23.	1.	0.	0.	31.	1.	13.	124.
	0.	LOSS		-2.	0.	0.	-4.	-2.	-45.	0.
JUL	330.	GAIN	23.	3.	0.	0.	42.	2.	34.	175.
	0.	LOSS		-1.	0.	0.	-2.	-1.	-25.	0.
AUG	301.	GAIN	20.	2.	0.	0.	36.	1.	24.	169.
	0.	LOSS		-1.	0.	0.	-2.	-1.	-27.	0.
SEP	167.	GAIN	17.	0.	0.	0.	22.	1.	14.	97.
	-22.	LOSS		-4.	0.	0.	-10.	-3.	-77.	0.
OCT	24.	GAIN	15.	0.	0.	0.	7.	0.	2.	11.
	-106.	LOSS		-13.	-1.	0.	-28.	-6.	-166.	0.
NOV	2.	GAIN	12.	0.	0.	0.	2.	0.	0.	1.
	-214.	LOSS		-19.	-1.	0.	-50.	-8.	-246.	0.
DEC	0.	GAIN	12.	0.	0.	0.	0.	0.	0.	0.
	-425.	LOSS		-29.	-1.	0.	-89.	-13.	-394.	0.
TOT	1125.	GAIN	215.	6.	0.	0.	177.	4.	94.	611.
	-1981.	LOSS		-159.	-8.	0.	-433.	-79.	-2349.	0.

MAX HEATING LOAD= -1386149. BTUH ON DEC 18 HOUR 9  
 MAX COOLING LOAD= 891200. BTUH ON SEP 2 HOUR 18

AMBIENT TEMP 3.  
 AMBIENT TEMP 86.

ZONE UA BTU/HR-F

5633.3

BLDG 651 - BARRACKS WITH A/C - NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	72.	70.	4 31	18 24	61. 33.	8.24	5.11	2.94	71.34
FEB	70.	75.	70.	9 28	24 24	66. 34.	7.44	4.62	2.65	64.44
MAR	70.	77.	70.	24 31	23 24	68. 32.	8.24	5.11	2.94	71.34
APR	72.	77.	70.	6 29	22 8	65. 61.	7.97	4.95	3.15	69.35
MAY	74.	78.	70.	21 24	1 10	65. 61.	8.24	5.11	3.86	72.26
JUN	76.	79.	72.	3 17	22 7	65. 61.	7.97	4.95	5.16	71.36
JUL	76.	78.	74.	28 10	18 5	90. 57.	8.24	5.11	5.70	74.10
AUG	76.	77.	70.	16 25	15 9	72. 63.	8.24	5.11	4.94	73.35
SEP	74.	79.	70.	4 30	7 24	67. 51.	7.97	4.95	4.16	70.35
OCT	72.	77.	70.	1 31	22 24	65. 44.	8.24	5.11	3.45	71.86
NOV	71.	77.	70.	7 30	22 24	67. 27.	7.97	4.95	3.06	69.25
DEC	70.	70.	70.	23 31	17 24	62. 42.	8.24	5.11	2.94	71.34
YEAR							97.00	60.18	44.96	850.34



BLDG 651 - BARRACKS WITH A/C - NIGHT SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	723	744	0	0	-.1222E+07	.0000
FEB	650	672	0	0	-.1153E+07	.0000
MAR	634	744	0	0	-.1199E+07	.2943E+06
APR	370	720	0	0	-.7024E+06	.3724E+06
MAY	101	744	0	0	-.3775E+06	.5982E+06
JUN	0	720	0	1	.0000	.8912E+06
JUL	0	744	0	32	.0000	.8912E+06
AUG	0	744	0	1	.0000	.8912E+06
SEP	127	720	0	4	-.3339E+06	.8912E+06
OCT	411	744	0	0	-.5682E+06	.5090E+06
NOV	542	720	0	0	-.8498E+06	.2693E+06
DEC	739	744	0	0	-.1386E+07	.0000
YEAR	4297	8760	0	38	-.1386E+07	.8912E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	633.73	.00	8.24	5.11	2.03	71.34	26.9
FEB	532.92	.00	7.44	4.62	1.84	64.44	26.9
MAR	459.57	.06	8.24	5.11	2.03	71.34	42.3
APR	216.49	1.02	7.97	4.95	2.02	69.35	46.4
MAY	44.65	3.35	8.24	5.11	2.20	72.26	58.0
JUN	.00	11.12	7.97	4.95	2.39	71.36	76.6
JUL	.00	16.89	8.24	5.11	2.55	74.10	77.1
AUG	.00	15.17	8.24	5.11	2.42	73.35	76.7
SEP	56.92	8.41	7.97	4.95	2.21	70.35	76.9
OCT	215.15	1.27	8.24	5.11	2.12	71.86	52.5
NOV	359.92	.10	7.97	4.95	2.00	69.25	40.2
DEC	631.31	.00	8.24	5.11	2.03	71.34	26.9
YEAR	3150.66	57.38	97.00	60.18	25.85	850.34	77.1

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 93349. BTU/(SQFT-YEAR)

BLDG 651 - BARRACKS WITH A/C - NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1222E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1153E+07
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2943E+06	-.1199E+07
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3724E+06	-.7024E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.5982E+06	-.3775E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.8912E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8912E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.8912E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8912E+06	-.3339E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.5090E+06	-.5682E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2693E+06	-.8498E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1386E+07

BLDG 651 - BARRACKS WITH A/C - DDC (FT LEONARD WOOD, MO)

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----- PROGRAM CONTROL OPTIONS -----
COOLING ON WEEKEND (1=YES, 0=NO) (ICWK)          1
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC)      0
WEEKEND INTERNAL GAINS FACTOR (WKEND)          1.000000
LAST CASE FLAG (1=YES, 0=NO) (LSTCS)           1
SKY CLEARNESS FACTOR (CLN)          9.700000E-01
NUMBER OF ZONES (NZ)                        1
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW)        0
----- SITE AND BUILDING DATA -----

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\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 437184.000000

FLOOR AREA (SQFT) 40986.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1664120.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -891200.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 409860.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 3167.000000

INFILTRATION PROFILE

.670	.670	.670	.670	.670	.670	.670	.670
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.670	.670	.670	.670	.670	.670

A FACTOR IN INFILTRATION EQUATION (CINA) 4.350000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 231200.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 0.000000E+00

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 47.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	8613.0	1828.0	8541.0	1826.0
WINDOW AREA SQFT (AWND)	435.0	18.5	467.0	17.2
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	43.5	1.9	46.7	1.7
WIDTH OF OVERHANG (WOH)	2.5	2.5	2.5	2.5
OVERHANG HGT ABV WNDW(HOH)	1.0	1.0	1.0	1.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)			0.000000E+00	
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)			9999.000000	
SKYLIGHT HEIGHT FT (SKH)			0.000000E+00	
SKYLIGHT WIDTH FT (SKW)			0.000000E+00	
SKYLIGHT OVERHANG WIDTH FT (SKOW)			0.000000E+00	
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)			0.000000E+00	
SKYLIGHT GLASS NUMBER (NS)			1	
SKYLIGHT SHADING COEFFICIENT (SHSK)			0.000000E+00	
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)			0.000000E+00	
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	PEOPLE		HEATING	COOLING
				SENSIBLE	LATENT		
		24.	47268.	84150.	39270.		
		HOURLY FRACTION OF PEAK					
1		.200	.000	1.000	1.000	68.0	78.0
2		.200	.000	1.000	1.000	68.0	78.0
3		.200	.000	1.000	1.000	68.0	78.0
4		.200	.000	1.000	1.000	68.0	78.0
5		.400	.000	1.000	1.000	68.0	78.0
6		.800	.000	1.000	1.000	68.0	78.0
7		1.000	.000	.800	.800	68.0	78.0
8		.200	.000	.400	.400	68.0	78.0
9		.200	.000	.100	.100	68.0	78.0
10		.200	.000	.100	.100	68.0	78.0
11		.200	.000	.100	.100	68.0	78.0
12		.200	.000	.100	.100	68.0	78.0

13	.200	.000	.100	.100	68.0	78.0
14	.200	.000	.100	.100	68.0	78.0
15	.200	.000	.100	.100	68.0	78.0
16	.400	.000	.300	.300	68.0	78.0
17	.800	.300	.800	.800	68.0	78.0
18	1.000	.300	.800	.800	68.0	78.0
19	1.000	.300	.500	.500	68.0	78.0
20	1.000	.300	.500	.500	68.0	78.0
21	1.000	.300	.800	.800	68.0	78.0
22	.800	.000	1.000	1.000	68.0	78.0
23	.200	.000	1.000	1.000	68.0	78.0
24	.200	.000	1.000	1.000	68.0	78.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					68.000000	
SYSTEM TYPE, (IECN)					9	
SUPPLY AIR CFM (SACFM)					27148.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01	
VAV TYPE (IVAV)					1	
VAV MINIMUM SUPPLY AIR FRACTION (ARMIN)					2.500000E-01	
VAV COLD DECK TEMPERATURE F (TCD)					58.000000	
VAV FAN PART LOAD FACTORS						
.000	.560	.200	.560	.300	.620	.400 .700
.500	.770	.600	.830	.700	.880	.800 .930
.900	.980	1.00	1.00			
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1700000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					2125000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					892000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					164905.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 651 - BARRACKS WITH A/C - DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -393.	GAIN LOSS	13.	0. -27.	0. -1.	0. 0.	0. -83.	0. -13.	0. -377.	0. 0.
FEB	0. -317.	GAIN LOSS	16.	0. -23.	0. -1.	0. 0.	1. -62.	0. -11.	0. -321.	0. 0.
MAR	0. -251.	GAIN LOSS	20.	0. -20.	0. -1.	0. 0.	5. -49.	0. -10.	0. -290.	0. 0.
APR	13. -96.	GAIN LOSS	20.	0. -12.	0. -1.	0. 0.	12. -24.	0. -6.	3. -172.	5. 0.
MAY	52. -11.	GAIN LOSS	22.	0. -6.	0. 0.	0. 0.	19. -12.	0. -4.	3. -108.	22. 0.
JUN	201. 0.	GAIN LOSS	23.	0. -3.	0. 0.	0. 0.	27. -6.	0. -2.	8. -54.	116. 0.
JUL	304. 0.	GAIN LOSS	23.	2. -1.	0. 0.	0. 0.	38. -3.	1. -1.	25. -32.	166. 0.
AUG	277. 0.	GAIN LOSS	20.	1. -1.	0. 0.	0. 0.	31. -3.	1. -2.	17. -35.	160. 0.
SEP	151. -13.	GAIN LOSS	17.	0. -5.	0. 0.	0. 0.	20. -10.	1. -3.	11. -78.	91. 0.
OCT	19. -83.	GAIN LOSS	15.	0. -12.	0. -1.	0. 0.	7. -26.	0. -5.	3. -152.	10. 0.
NOV	1. -185.	GAIN LOSS	12.	0. -18.	0. -1.	0. 0.	2. -46.	0. -8.	0. -224.	1. 0.
DEC	0. -384.	GAIN LOSS	12.	0. -28.	0. -1.	0. 0.	0. -83.	0. -12.	0. -361.	0. 0.
TOT	1018. -1733.	GAIN LOSS	215.	3. -154.	0. -7.	0. 0.	163. -407.	3. -76.	71. -2203.	570. 0.

MAX HEATING LOAD= -1318573. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 891200. BTUH ON JUL 28 HOUR 18      AMBIENT TEMP 90.

ZONE UA BTU/HR-F      5633.3

## BEACON Energy Analysis By Energy Systems Engineers, Inc.

651-1.I

BLDG 651 - BARRACKS WITH A/C - DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	68.	72.	68.	4 31	18 24	61. 33.	8.24	5.11	2.94	71.34
FEB	68.	74.	68.	9 28	24 24	66. 34.	7.44	4.62	2.65	64.44
MAR	69.	78.	68.	24 31	22 24	68. 32.	8.24	5.11	2.94	71.34
APR	71.	79.	68.	30 29	22 8	67. 61.	7.97	4.95	2.91	69.10
MAY	75.	79.	68.	26 23	22 11	66. 61.	8.24	5.11	3.55	71.95
JUN	78.	80.	73.	3 17	22 7	65. 61.	7.97	4.95	4.52	70.71
JUL	78.	79.	76.	30 10	8 5	75. 57.	8.24	5.11	4.78	73.19
AUG	78.	79.	71.	1 25	11 9	75. 63.	8.24	5.11	4.26	72.66
SEP	75.	80.	68.	4 30	1 24	67. 51.	7.97	4.95	3.74	69.94
OCT	71.	79.	68.	15 31	11 24	71. 44.	8.24	5.11	3.28	71.68
NOV	69.	79.	68.	8 30	22 24	67. 27.	7.97	4.95	2.93	69.12
DEC	68.	69.	68.	23 31	17 24	62. 42.	8.24	5.11	2.94	71.34
YEAR							97.00	60.18	41.44	846.82



BLDG 651 - BARRACKS WITH A/C - DDC (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	704	744	0	0	-.1152E+07	.0000
FEB	645	672	0	0	-.1083E+07	.0000
MAR	613	744	0	0	-.1128E+07	.3214E+06
APR	329	720	0	0	-.6438E+06	.3954E+06
MAY	74	744	0	0	-.3275E+06	.5514E+06
JUN	0	720	0	0	.0000	.8544E+06
JUL	0	744	0	16	.0000	.8912E+06
AUG	0	744	0	0	.0000	.8634E+06
SEP	84	720	0	0	-.2893E+06	.8816E+06
OCT	367	744	0	0	-.5125E+06	.4615E+06
NOV	501	720	0	0	-.7881E+06	.2785E+06
DEC	732	744	0	0	-.1319E+07	.0000
YEAR	4049	8760	0	16	-.1319E+07	.8912E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	586.61	.00	8.24	5.11	2.03	71.34	26.9
FEB	493.10	.00	7.44	4.62	1.84	64.44	26.9
MAR	417.73	.02	8.24	5.11	2.03	71.34	26.9
APR	183.37	.73	7.97	4.95	1.98	69.10	46.8
MAY	32.05	2.80	8.24	5.11	2.14	71.95	55.2
JUN	.00	10.08	7.97	4.95	2.26	70.71	73.9
JUL	.00	15.46	8.24	5.11	2.39	73.19	77.0
AUG	.00	13.91	8.24	5.11	2.28	72.66	74.6
SEP	35.38	7.55	7.97	4.95	2.13	69.94	75.8
OCT	181.05	1.01	8.24	5.11	2.09	71.68	50.0
NOV	318.29	.07	7.97	4.95	1.98	69.12	40.9
DEC	585.32	.00	8.24	5.11	2.03	71.34	26.9
YEAR	2832.90	51.62	97.00	60.18	25.20	846.82	77.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 85062. BTU/(SQFT-YEAR)

BLDG 651 - BARRACKS WITH A/C - DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS SYSTEM COOL	WHEN LOADS NOT MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1152E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1083E+07
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.3214E+06	-.1128E+07
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3954E+06	-.6438E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.5514E+06	-.3275E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.8544E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8912E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.8634E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8816E+06	-.2893E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.4615E+06	-.5125E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2785E+06	-.7881E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1319E+07

BLDG 651 - BARRACKS WITH A/C - ECONOMIZER (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 437184.000000

FLOOR AREA (SQFT) 40986.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1664120.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -891200.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 409860.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 3167.000000

INFILTRATION PROFILE

.670	.670	.670	.670	.670	.670	.670	.670
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.670	.670	.670	.670	.670	.670

A FACTOR IN INFILTRATION EQUATION (CINA) 4.350000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 231200.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 0.000000E+00

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 47.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	8613.0	1828.0	8541.0	1826.0
WINDOW AREA SQFT (AWND)	435.0	18.5	467.0	17.2
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	43.5	1.9	46.7	1.7
WIDTH OF OVERHANG (WOH)	2.5	2.5	2.5	2.5
OVERHANG HGT ABV WNDW (HOH)	1.0	1.0	1.0	1.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERLIGHT HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	KW	BTU/HR				HEATING	COOLING
		LIGHTS	PROCESS	SENSIBLE	LATENT	PEOPLE		
		24.	47268.	84150.	39270.			
		HOURLY FRACTION OF PEAK						
	1	.200	.000	1.000	1.000	68.0	78.0	
	2	.200	.000	1.000	1.000	68.0	78.0	
	3	.200	.000	1.000	1.000	68.0	78.0	
	4	.200	.000	1.000	1.000	68.0	78.0	
	5	.400	.000	1.000	1.000	68.0	78.0	
	6	.800	.000	1.000	1.000	68.0	78.0	
	7	1.000	.000	.800	.800	68.0	78.0	
	8	.200	.000	.400	.400	68.0	78.0	
	9	.200	.000	.100	.100	68.0	78.0	
	10	.200	.000	.100	.100	68.0	78.0	
	11	.200	.000	.100	.100	68.0	78.0	
	12	.200	.000	.100	.100	68.0	78.0	

13	.200	.000	.100	.100	68.0	78.0
14	.200	.000	.100	.100	68.0	78.0
15	.200	.000	.100	.100	68.0	78.0
16	.400	.000	.300	.300	68.0	78.0
17	.800	.300	.800	.800	68.0	78.0
18	1.000	.300	.800	.800	68.0	78.0
19	1.000	.300	.500	.500	68.0	78.0
20	1.000	.300	.500	.500	68.0	78.0
21	1.000	.300	.800	.800	68.0	78.0
22	.800	.000	1.000	1.000	68.0	78.0
23	.200	.000	1.000	1.000	68.0	78.0
24	.200	.000	1.000	1.000	68.0	78.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					68.000000	
SYSTEM TYPE, (IECN)					9	
SUPPLY AIR CFM (SACFM)					27148.000000	
ECONOMIZER HIGH TEMP LIMIT F					68.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01	
VAV TYPE (IVAV)					1	
VAV MINIMUM SUPPLY AIR FRACTION (ARMIN)					2.500000E-01	
VAV COLD DECK TEMPERATURE F (TCD)					58.000000	
VAV FAN PART LOAD FACTORS						
.000	.560	.200	.560	.300	.620	.400 .700
.500	.770	.600	.830	.700	.880	.800 .930
.900	.980	1.00	1.00			
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1700000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					2125000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					892000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					164905.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 651 - BARRACKS WITH A/C - ECONOMIZER (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -393.	GAIN LOSS	13.	0. -27.	0. -1.	0. 0.	0. -83.	0. -13.	0. -377.	0. 0.
FEB	0. -317.	GAIN LOSS	16.	0. -23.	0. -1.	0. 0.	1. -62.	0. -11.	0. -321.	0. 0.
MAR	0. -251.	GAIN LOSS	20.	0. -20.	0. -1.	0. 0.	5. -49.	0. -10.	0. -291.	0. 0.
APR	13. -96.	GAIN LOSS	20.	0. -12.	0. -1.	0. 0.	12. -24.	0. -6.	3. -174.	5. 0.
MAY	51. -11.	GAIN LOSS	22.	0. -6.	0. 0.	0. 0.	20. -12.	0. -4.	3. -111.	22. 0.
JUN	199. 0.	GAIN LOSS	23.	0. -3.	0. 0.	0. 0.	27. -5.	0. -2.	8. -60.	115. 0.
JUL	303. 0.	GAIN LOSS	23.	2. -1.	0. 0.	0. 0.	38. -3.	1. -1.	25. -36.	165. 0.
AUG	276. 0.	GAIN LOSS	20.	1. -1.	0. 0.	0. 0.	31. -3.	1. -2.	17. -38.	159. 0.
SEP	150. -13.	GAIN LOSS	17.	0. -5.	0. 0.	0. 0.	20. -10.	1. -3.	11. -82.	90. 0.
OCT	19. -83.	GAIN LOSS	15.	0. -12.	0. -1.	0. 0.	7. -25.	0. -5.	3. -155.	9. 0.
NOV	1. -185.	GAIN LOSS	12.	0. -18.	0. -1.	0. 0.	2. -46.	0. -8.	0. -226.	1. 0.
DEC	0. -384.	GAIN LOSS	12.	0. -28.	0. -1.	0. 0.	0. -83.	0. -12.	0. -361.	0. 0.
TOT	1013. -1733.	GAIN LOSS	215.	3. -154.	0. -7.	0. 0.	164. -406.	3. -76.	71. -2231.	566. 0.

MAX HEATING LOAD= -1318573. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 891200. BTUH ON JUL 28 HOUR 18      AMBIENT TEMP 90.

ZONE UA BTU/HR-F 5633.3

BLDG 651 - BARRACKS WITH A/C - ECONOMIZER (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	68.	72.	68.	4 31	18 24	61. 33.	8.24	5.11	2.94	71.34
FEB	68.	74.	68.	9 28	24 24	66. 34.	7.44	4.62	2.65	64.44
MAR	69.	79.	68.	24 31	22 24	68. 32.	8.24	5.11	2.94	71.34
APR	71.	79.	68.	27 29	10 8	70. 61.	7.97	4.95	2.87	69.06
MAY	75.	79.	68.	31 23	3 11	67. 61.	8.24	5.11	3.13	71.53
JUN	78.	79.	73.	6 17	1 8	67. 66.	7.97	4.95	3.45	69.65
JUL	78.	79.	76.	23 10	6 5	67. 57.	8.24	5.11	4.29	72.69
AUG	78.	80.	71.	24 25	5 10	67. 65.	8.24	5.11	3.82	72.22
SEP	75.	80.	68.	13 30	7 24	72. 51.	7.97	4.95	3.26	69.46
OCT	71.	79.	68.	6 31	17 24	69. 44.	8.24	5.11	2.96	71.36
NOV	69.	78.	68.	8 30	13 24	77. 27.	7.97	4.95	2.84	69.04
DEC	68.	69.	68.	23 31	17 24	62. 42.	8.24	5.11	2.94	71.34
YEAR							97.00	60.18	38.09	843.47



BLDG 651 - BARRACKS WITH A/C - ECONOMIZER (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	704	744	0	0	-.1152E+07	.0000
FEB	645	672	0	0	-.1083E+07	.0000
MAR	613	744	0	0	-.1128E+07	.3233E+06
APR	330	720	0	0	-.6437E+06	.3967E+06
MAY	74	744	0	0	-.3275E+06	.5536E+06
JUN	0	720	0	0	.0000	.8544E+06
JUL	0	744	0	16	.0000	.8912E+06
AUG	0	744	0	0	.0000	.8634E+06
SEP	87	720	0	0	-.2893E+06	.8817E+06
OCT	369	744	0	0	-.5125E+06	.4693E+06
NOV	502	720	0	0	-.7881E+06	.2762E+06
DEC	732	744	0	0	-.1319E+07	.0000
YEAR	4056	8760	0	16	-.1319E+07	.8912E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	586.61	.00	8.24	5.11	2.03	71.34	26.9
FEB	493.10	.00	7.44	4.62	1.84	64.44	26.9
MAR	418.14	.02	8.24	5.11	2.03	71.34	26.9
APR	184.21	.71	7.97	4.95	1.97	69.06	46.8
MAY	32.45	2.76	8.24	5.11	2.07	71.53	55.3
JUN	.00	10.02	7.97	4.95	2.10	69.65	73.9
JUL	.00	15.41	8.24	5.11	2.31	72.69	77.0
AUG	.00	13.89	8.24	5.11	2.22	72.22	74.6
SEP	37.01	7.51	7.97	4.95	2.06	69.46	75.8
OCT	182.23	.99	8.24	5.11	2.04	71.36	50.3
NOV	320.33	.07	7.97	4.95	1.97	69.04	40.7
DEC	585.32	.00	8.24	5.11	2.03	71.34	26.9
YEAR	2839.39	51.38	97.00	60.18	24.67	843.47	77.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 85156. BTU/(SQFT-YEAR)

BLDG 651 - BARRACKS WITH A/C - ECONOMIZER (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0 0	.0000	-.1152E+07
FEB	1421.	901.	1.000	37.	0.	0.	0 0	.0000	-.1083E+07
MAR	1864.	1216.	1.000	43.	0.	0.	0 0	.3233E+06	-.1128E+07
APR	2242.	1552.	1.000	55.	0.	0.	0 0	.3967E+06	-.6437E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0 0	.5536E+06	-.3275E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0 0	.8544E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0 0	.8912E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0 0	.8634E+06	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0 0	.8817E+06	-.2893E+06
OCT	1394.	924.	1.000	57.	0.	0.	0 0	.4693E+06	-.5125E+06
NOV	1008.	710.	1.000	47.	0.	0.	0 0	.2762E+06	-.7881E+06
DEC	856.	586.	1.000	35.	0.	0.	0 0	.0000	-.1319E+07

BLDG 651 - BARRACKS WITH A/C - DAYTIME OUTSIDE AIR (FT L. WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 437184.000000

FLOOR AREA (SQFT) 40986.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1664120.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -891200.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 409860.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 3167.000000

## INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	.000
.330	.330	.330	.330	.330	.330	.330	.330
.330	.330	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 4.350000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 231200.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 0.000000E+00

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 47.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	8613.0	1828.0	8541.0	1826.0
WINDOW AREA SQFT (AWND)	435.0	18.5	467.0	17.2
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	43.5	1.9	46.7	1.7
WIDTH OF OVERHANG (WOH)	2.5	2.5	2.5	2.5
OVERHANG HGT ABV WNDW (HOH)	1.0	1.0	1.0	1.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
		24.	47268.	84150.	39270.		
		HOURLY FRACTION OF PEAK					
1		.200	.000	1.000	1.000	72.0	76.0
2		.200	.000	1.000	1.000	72.0	76.0
3		.200	.000	1.000	1.000	72.0	76.0
4		.200	.000	1.000	1.000	72.0	76.0
5		.400	.000	1.000	1.000	72.0	76.0
6		.800	.000	1.000	1.000	72.0	76.0
7	1.000	.000	.800	.800		72.0	76.0
8	.200	.000	.400	.400		72.0	76.0
9	.200	.000	.100	.100		72.0	76.0
10	.200	.000	.100	.100		72.0	76.0
11	.200	.000	.100	.100		72.0	76.0
12	.200	.000	.100	.100		72.0	76.0

13	.200	.000	.100	.100	72.0	76.0
14	.200	.000	.100	.100	72.0	76.0
15	.200	.000	.100	.100	72.0	76.0
16	.400	.000	.300	.300	72.0	76.0
17	.800	.300	.800	.800	72.0	76.0
18	1.000	.300	.800	.800	72.0	76.0
19	1.000	.300	.500	.500	72.0	76.0
20	1.000	.300	.500	.500	72.0	76.0
21	1.000	.300	.800	.800	72.0	76.0
22	.800	.000	1.000	1.000	72.0	76.0
23	.200	.000	1.000	1.000	72.0	76.0
24	.200	.000	1.000	1.000	72.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					68.000000	
SYSTEM TYPE, (IECN)					9	
SUPPLY AIR CFM (SACFM)					27148.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01	
VAV TYPE (IVAV)					1	
VAV MINIMUM SUPPLY AIR FRACTION (ARMIN)					2.500000E-01	
VAV COLD DECK TEMPERATURE F (TCD)					58.000000	
VAV FAN PART LOAD FACTORS						
.000	.560	.200	.560	.300	.620	.400 .700
.500	.770	.600	.830	.700	.880	.800 .930
.900	.980	1.00	1.00			
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1700000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					2125000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					892000.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					164905.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 651 - BARRACKS WITH A/C - DAYTIME OUTSIDE AIR (FT L. WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	13.	0.	0.	0.	0.	0.	0.	0.
	-405.	LOSS		-29.	-1.	0.	-94.	-14.	-371.	0.
FEB	0.	GAIN	16.	0.	0.	0.	0.	0.	0.	0.
	-331.	LOSS		-26.	-1.	0.	-72.	-12.	-319.	0.
MAR	1.	GAIN	20.	0.	0.	0.	3.	0.	0.	1.
	-271.	LOSS		-22.	-1.	0.	-59.	-11.	-292.	0.
APR	19.	GAIN	20.	0.	0.	0.	11.	0.	2.	6.
	-115.	LOSS		-14.	-1.	0.	-30.	-7.	-172.	0.
MAY	58.49	GAIN	22.17	.04	.02	.00	20.16	.23	3.40	20.58
	-18.84	LOSS		-5.99	-.36	.00	-12.23	-3.68	-96.52	.00
JUN	193.	GAIN	23.	1.	0.	0.	31.	1.	10.	97.
	0.	LOSS		-2.	0.	0.	-4.	-2.	-39.	0.
JUL	288.	GAIN	23.	3.	0.	0.	42.	2.	27.	139.
	0.	LOSS		-1.	0.	0.	-2.	-1.	-21.	0.
AUG	259.	GAIN	20.	2.	0.	0.	36.	1.	18.	132.
	0.	LOSS		-1.	0.	0.	-2.	-1.	-22.	0.
SEP	147.	GAIN	17.	0.	0.	0.	21.	1.	11.	78.
	-24.	LOSS		-5.	0.	0.	-11.	-3.	-71.	0.
OCT	22.	GAIN	15.	0.	0.	0.	6.	0.	2.	10.
	-105.	LOSS		-14.	-1.	0.	-31.	-6.	-155.	0.
NOV	2.	GAIN	12.	0.	0.	0.	2.	0.	0.	1.
	-203.	LOSS		-20.	-1.	0.	-55.	-9.	-226.	0.
DEC	0.	GAIN	12.	0.	0.	0.	0.	0.	0.	0.
	-396.	LOSS		-31.	-1.	0.	-95.	-14.	-356.	0.
TOT	990.	GAIN	215.	6.	0.	0.	172.	4.	73.	483.
	-1868.	LOSS		-169.	-8.	0.	-468.	-84.	-2141.	0.

MAX HEATING LOAD= -1258288. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 891200. BTUH ON JUL 28 HOUR 18      AMBIENT TEMP 90.

ZONE UA BTU/HR-F      5633.3

## BEACON Energy Analysis By Energy Systems Engineers, Inc.

651-5.I

BLDG 651 - BARRACKS WITH A/C - DAYTIME OUTSIDE AIR (FT L. WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	72.	73.	72.	4 31	18 24	61. 33.	8.24	5.11	2.94	71.34
FEB	72.	76.	72.	9 28	24 24	66. 34.	7.44	4.62	2.65	64.44
MAR	72.	77.	72.	24 28	23 10	68. 68.	8.24	5.11	2.94	71.34
APR	73.	78.	72.	6 2	22 12	65. 69.	7.97	4.95	3.19	69.38
MAY	75.	78.	72.	21 24	1 10	65. 61.	8.24	5.11	3.93	72.34
JUN	76.	80.	73.	3 17	22 6	65. 57.	7.97	4.95	5.19	71.39
JUL	76.	78.	75.	23 10	21 5	65. 57.	8.24	5.11	5.51	73.91
AUG	76.	78.	72.	21 25	24 9	65. 63.	8.24	5.11	4.88	73.28
SEP	75.	79.	72.	4 17	7 10	67. 68.	7.97	4.95	4.21	70.40
OCT	73.	77.	72.	1 12	22 13	65. 70.	8.24	5.11	3.56	71.96
NOV	72.	78.	72.	8 16	22 14	67. 68.	7.97	4.95	3.08	69.28
DEC	72.	72.	72.	23 23	17 15	62. 70.	8.24	5.11	2.94	71.34
YEAR							97.00	60.18	45.01	850.39



BLDG 651 - BARRACKS WITH A/C - DAYTIME OUTSIDE AIR (FT L. WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	731	744	0	0	-.1109E+07	.0000
FEB	653	672	0	0	-.1074E+07	.0000
MAR	644	744	1	0	-.1118E+07	.2642E+06
APR	388	720	2	0	-.6624E+06	.3504E+06
MAY	121	744	0	0	-.3422E+06	.5427E+06
JUN	0	720	0	0	.0000	.7948E+06
JUL	0	744	0	11	.0000	.8912E+06
AUG	2	744	0	0	-.8231E+05	.7995E+06
SEP	143	720	2	0	-.3257E+06	.8468E+06
OCT	429	744	4	0	-.5439E+06	.4539E+06
NOV	578	720	4	0	-.7915E+06	.2439E+06
DEC	743	744	3	0	-.1258E+07	.0000
YEAR	4432	8760	16	11	-.1258E+07	.8912E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	606.86	.00	8.24	5.11	2.03	71.34	26.9
FEB	509.09	.00	7.44	4.62	1.84	64.44	26.9
MAR	442.90	.09	8.24	5.11	2.04	71.34	41.5
APR	216.29	1.10	7.97	4.95	2.03	69.38	45.7
MAY	50.88	3.25	8.24	5.11	2.22	72.34	55.0
JUN	.00	9.84	7.97	4.95	2.39	71.39	70.3
JUL	.00	14.73	8.24	5.11	2.52	73.91	77.0
AUG	.81	13.12	8.24	5.11	2.40	73.28	70.6
SEP	62.03	7.41	7.97	4.95	2.22	70.40	73.8
OCT	215.85	1.25	8.24	5.11	2.14	71.96	49.9
NOV	355.00	.11	7.97	4.95	2.01	69.28	39.8
DEC	599.41	.00	8.24	5.11	2.03	71.34	26.9
YEAR	3059.12	50.89	97.00	60.18	25.87	850.39	77.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR

90576. BTU/(SQFT-YEAR)

BLDG 651 - BARRACKS WITH A/C - DAYTIME OUTSIDE AIR (FT L. WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT - DEG. F	HOURS SYSTEM COOL	WHEN LOADS NOT MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1109E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1074E+07
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.2642E+06	-.1118E+07
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.3504E+06	-.6624E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.5427E+06	-.3422E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.7948E+06	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8912E+06	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.7995E+06	-.8231E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8468E+06	-.3257E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.4539E+06	-.5439E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.2439E+06	-.7915E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1258E+07

**COMPUTER SIMULATIONS**

BUILDING 655

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 655  
BLDG. TYPE: ADMIN./ SUPPLY

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	865.6	622.9	588.9			
COOLING (kWH)						

SUPPLY AIR FAN	0 CFM
FLOOR AREA	11861 FT <sup>2</sup>
CFM/F	896 CFM
UA	4132 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT ) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	600	1800	60 HR	HR. ON HEATING	1872 HR/YR
SAT.	600	1800	12 HR	HR. ON COOLING	1255 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING	2496 HR/YR
	TOTAL OCCUPY HR.		72 HR/WK	HR. OFF COOLING	1673 HR/YR
	TOTAL UNOCC. HR.		96 HR/WK		
	ANNUAL OCCUPY HR.		3754 HR/YR		
	ANNUAL UNOCC. HR.		5006 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOAUHC 865.6 MBtu - 0 MBtu = 2496 HR/YR  
HOAUH 896 CFM \* 5006 HR/YR = 1673 HR/YR  
COAUHC 0 kWH - 0 kWH =  
COAUC 896 CFM \* 5006 HR/YR =  
HOAOHC 0 kWH - 0 kWH =  
HOAOH 896 CFM \* 1673 HR/YR =  
COAOHC 865.6 MBtu - 0 MBtu =  
COAOC 896 CFM \* 3754 HR/YR =  
HOAOHC 865.6 MBtu - 0 MBtu =  
HOAOH 896 CFM \* 1872 HR/YR =  
COAOHC 0 kWH - 0 kWH =  
COAOC 896 CFM \* 3754 HR/YR =  
HOAOHC 865.6 MBtu - 0 MBtu =  
HOAOH 896 CFM \* 1872 HR/YR =  
COAOHC 0 kWH - 0 kWH =  
COAOC 896 CFM \* 1255 HR/YR =

HOAUHC	865.6 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	896 CFM *	5006 HR/YR		
HOAUH	865.6 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	896 CFM *	2496 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	896 CFM *	5006 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	896 CFM *	1673 HR/YR		
HOAOHC	865.6 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	896 CFM *	3754 HR/YR		
HOAOH	865.6 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	896 CFM *	1872 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	896 CFM *	3754 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	896 CFM *	1255 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 655  
BLDG. TYPE: ADMIN./ SUPPLY

**ENERGY CONSTANT CALCULATIONS**

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	1255 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	3754 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	5006 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	1673 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	3754 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	1255 HR/YR		
NSC	865.6 MBtu -	622.91 MBtu	=	5.87E+04 Btu/UA
	4132 UA			
DSC	622.91 MBtu -	588.89 MBtu	=	8.23E+03 Btu/UA
	4132 UA			
OPT	( 2 HR/DAY X 272 DAY/YR ) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 08-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 655BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 655 BLDG NAME: ADMINISTRATION / SUPPLY

BLDG FUNCTION: COMPANY ADMINISTRATION / SUPPLY

FLOOR AREA: (SQ. FT) 11,861

# FLOORS 1

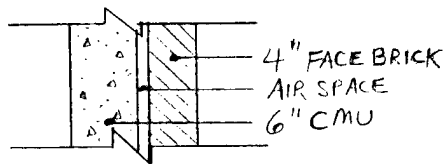
SLAB PERIMETER: (FT) 509

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	2,859	3,278	729	476	7,342
GLASS	(SQ. FT)	310	976	0	0	1,286
PERSONNEL DOOR	(SQ. FT)	297	105	0	0	402
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	2,252	2,197	729	476	5,654
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					11,869
OVERHEAD DOOR	(SQ. FT)	0				402
PERSONNEL DOOR	(SQ. FT)					402
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

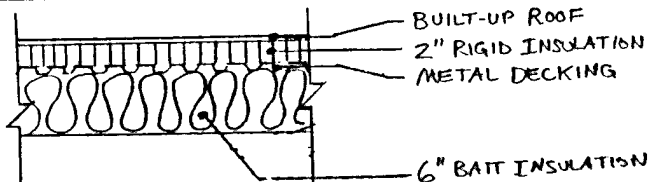
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECKING	0.00
5. 6" BATT INSULATION	19.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	26.87
U=1/R	0.037

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	4" CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	7342	X CFM / SQ.FT.	0.115	= 844
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	15	X CFM / OPENING / HR	1.600	=	24
DOOR OPENINGS / HR - DOUBLE DOORS	20	X CFM / OPENING / HR	1.385	=	28
TOTAL INFILTRATION (CFM)				=	896

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	402	X DOOR 'U'	0.391	=	157
UA WALL	= WALL AREA	5,654	X WALL 'U'	0.245	=	1,385
UA ROOF	= ROOF AREA	11,869	X ROOF 'U'	0.037	=	442
UA GLASS	= GLASS AREA	1,286	X GLASS 'U'	0.621	=	799
UA SLAB	= SLAB PERIM.	509	X SLF	0.830	=	422
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	896	X A. T. F.	1.035	=	927

TOTAL UA (BTU/HR°F) 4,132

**EMC Engineers, Inc.**  
PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

3204-000

08-Feb-93  
BHS  
CEL  
655Z1  
655

**ZONE:**

## Rates of Heat Gain from Occupants of Conditioned Spaces

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	59	20	Incandescent -- 100w	100	5,900
	17	18	Incandescent -- 60w	60	1,020
	16	2	Fluorescent, 2 -- 40w lamps, 16w ballast (1x4 ft. fixture)	96	1,536
	39	8	Fluorescent, 4 -- 34w lamps, 2 -- 16w ballasts (2x4 ft. fix.)	168	6,552
TOTAL					
	131			TOTAL	15,008

## Peak Value for Internal Gains

[illegible]

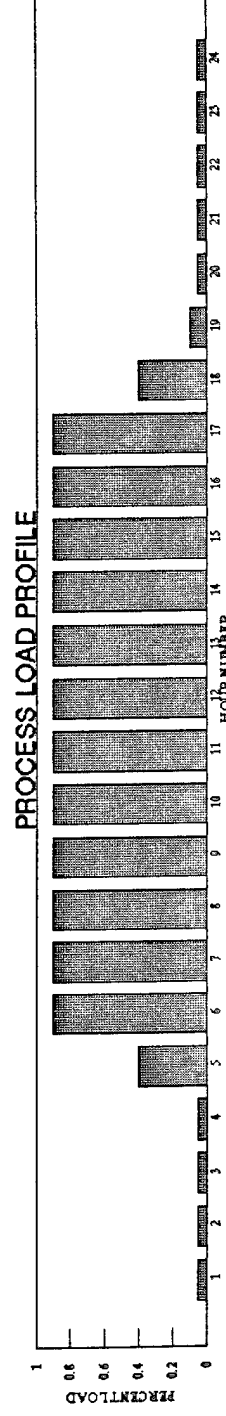
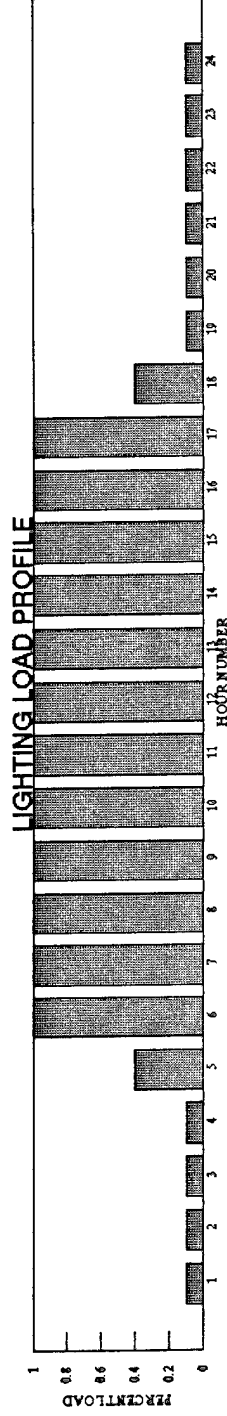
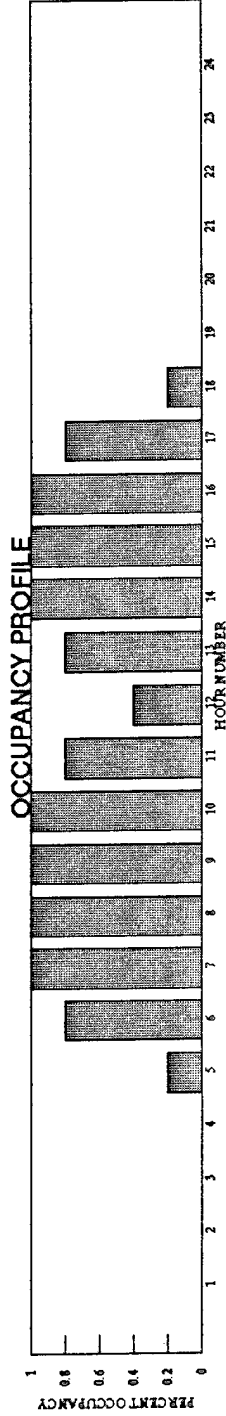


# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 08-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 655Z1  
 BLDG: 655  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
3	Administration	OCCUPANCY					0.2	0.8	1	1	1	1	0.8	0.4	0.8	1	1	1	0.8	0.2							
		LIGHTING	0.1	0.1	0.1	0.1	0.4	1	1	1	1	1	1	1	1	1	1	1	1	0.4	0.1	0.1	0.1	0.1	0.1	0.1	
		PROCESS	0.1	0.1	0.1	0.1	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.4	0.1	0.1	0.1	0.1	0.1	0.1	



BLDG 655 - ADMINISTRATION / SUPPLY BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 6.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (ALL) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 1.000000

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 146321.000000

FLOOR AREA (SQFT) 11861.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 493300.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 118610.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 896.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 3.670000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 22638.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 442.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 157.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	2197.0	476.0	2252.0	729.0
WINDOW AREA SQFT (AWND)	976.0	.0	310.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	.0	10.0	.0
WINDOW WIDTH FT (WNDW)	97.6	.0	31.0	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	11869.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	3.700000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	7.043545E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.713E-05	.105E-02	.391E-02	.193E-02
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.18	.410	-.444E-01
SKYLIGHT TILT DEGREES (TILT)				.500E-03
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)				9999.000000
SKYLIGHT HEIGHT FT (SKH)				0.000000E+00
SKYLIGHT WIDTH FT (SKW)				0.000000E+00
SKYLIGHT OVERHANG WIDTH FT (SKOW)				0.000000E+00
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)				0.000000E+00
SKYLIGHT GLASS NUMBER (NS)			1	
SKYLIGHT SHADING COEFFICIENT (SHSK)				0.000000E+00
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)				0.000000E+00
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)				1.292998
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)				1.292998
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)				4.500000E-01

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	KW	BTU/HR				HEATING	COOLING
			LIGHTS	PROCESS	SENSIBLE	LATENT		
			12.	19279.	7500.	6000.		
			HOURLY FRACTION OF PEAK					
1		.100	.050	.000	.000	.000	70.0	.0
2		.100	.050	.000	.000	.000	70.0	.0
3		.100	.050	.000	.000	.000	70.0	.0
4		.100	.050	.000	.000	.000	70.0	.0
5		.400	.400	.200	.200	.000	70.0	.0
6		1.000	.800	1.000	1.000	.000	70.0	.0
7		1.000	.800	1.000	1.000	.000	70.0	.0
8		1.000	.800	1.000	1.000	.000	70.0	.0
9		1.000	1.000	1.000	1.000	.000	70.0	.0
10		1.000	1.000	1.000	1.000	.000	70.0	.0
11		1.000	1.000	.800	.800	.000	70.0	.0
12		1.000	.700	.400	.400	.000	70.0	.0

13	1.000	1.000	.800	.800	70.0	.0	
14	1.000	1.000	1.000	1.000	70.0	.0	
15	1.000	1.000	1.000	1.000	70.0	.0	
16	1.000	1.000	1.000	1.000	70.0	.0	
17	1.000	.800	1.000	1.000	70.0	.0	
18	.800	.600	.800	.800	70.0	.0	
19	.200	.200	.200	.200	70.0	.0	
20	.100	.050	.000	.000	70.0	.0	
21	.100	.050	.000	.000	70.0	.0	
22	.100	.050	.000	.000	70.0	.0	
23	.100	.050	.000	.000	70.0	.0	
24	.100	.050	.000	.000	70.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					0.000000E+00		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					493300.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					616625.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 655 - ADMINISTRATION / SUPPLY BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	21.	0.	0.	0.	0.	0.	0.	0.
	-130.	LOSS		-13.	-16.	0.	-29.	-18.	-100.	0.
FEB	0.	GAIN	24.	0.	0.	0.	0.	0.	0.	0.
	-102.	LOSS		-11.	-14.	0.	-23.	-15.	-86.	0.
MAR	.00	GAIN	29.45	.00	.00	.00	.21	.00	.00	.00
	-81.62	LOSS		-10.03	-13.22	.00	-18.73	-14.97	-79.79	.00
APR	.00	GAIN	28.22	.00	.00	.00	.64	.00	.00	.00
	-36.04	LOSS		-6.67	-9.27	.00	-10.31	-10.56	-52.45	.00
MAY	.00	GAIN	30.73	.00	.00	.00	.87	.00	.01	.00
	-11.36	LOSS		-5.46	-8.15	.00	-6.93	-8.94	-39.21	.00
JUN	.00	GAIN	30.87	.00	.00	.00	1.23	.00	.00	.00
	-1.91	LOSS		-4.44	-7.09	.00	-4.74	-7.84	-34.33	.00
JUL	.00	GAIN	31.21	.00	.01	.00	1.30	.01	.05	.00
	-.71	LOSS		-4.36	-7.07	.00	-4.71	-7.88	-34.67	.00
AUG	.00	GAIN	27.85	.01	.00	.00	.99	.00	.01	.00
	-1.09	LOSS		-4.47	-6.86	.00	-5.24	-7.52	-31.90	.00
SEP	.00	GAIN	25.12	.00	.01	.00	.78	.01	.03	.00
	-11.54	LOSS		-5.20	-6.91	.00	-6.63	-7.75	-35.37	.00
OCT	.00	GAIN	23.46	.00	.00	.00	.11	.00	.00	.00
	-32.56	LOSS		-7.23	-8.76	.00	-11.74	-9.70	-44.53	.00
NOV	.00	GAIN	20.32	.00	.00	.00	.01	.00	.00	.00
	-64.45	LOSS		-9.06	-10.89	.00	-17.96	-12.07	-59.71	.00
DEC	0.	GAIN	19.	0.	0.	0.	0.	0.	0.	0.
	-126.	LOSS		-13.	-16.	0.	-30.	-17.	-95.	0.
TOT	0.	GAIN	311.	0.	0.	0.	6.	0.	0.	0.
	-598.	LOSS		-93.	-123.	0.	-169.	-138.	-693.	0.

MAX HEATING LOAD= -493300. BTUH ON DEC 18 HOUR 4 AMBIENT TEMP 1.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 2778.7

BLDG 655 - ADMINISTRATION / SUPPLY BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	85.	69.	5 29	16 4	61. 11.	4.85	14.95	.00	25.82
FEB	71.	86.	69.	13 2	16 4	68. 14.	4.33	13.33	.00	23.04
MAR	73.	104.	69.	28 4	16 4	76. 15.	4.78	14.73	.00	25.45
APR	77.	108.	69.	30 9	16 4	84. 31.	4.61	14.19	.00	24.52
MAY	84.	115.	69.	29 11	16 4	85. 38.	4.85	14.95	.00	25.82
JUN	89.	119.	70.	29 16	16 4	87. 55.	4.61	14.19	.00	24.52
JUL	93.	125.	70.	31 10	16 4	95. 57.	4.78	14.73	.00	25.45
AUG	91.	120.	70.	29 25	16 4	95. 54.	4.85	14.95	.00	25.82
SEP	84.	117.	69.	7 15	16 4	86. 41.	4.54	13.98	.00	24.15
OCT	77.	112.	69.	4 28	16 4	81. 30.	4.85	14.95	.00	25.82
NOV	73.	100.	69.	8 3	16 4	75. 17.	4.68	14.41	.00	24.89
DEC	70.	85.	68.	23 18	16 4	67. 1.	4.71	14.52	.00	25.08
YEAR							56.42	173.89	.00	300.40

BLDG 655 - ADMINISTRATION / SUPPLY BASERUN (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	671	0	0	0	-.4601E+06	.0000
FEB	555	0	0	0	-.4023E+06	.0000
MAR	523	0	0	0	-.3972E+06	.0000
APR	330	0	0	0	-.2511E+06	.0000
MAY	179	0	0	0	-.1746E+06	.0000
JUN	54	0	0	0	-.7681E+05	.0000
JUL	26	0	0	0	-.6304E+05	.0000
AUG	28	0	0	0	-.8032E+05	.0000
SEP	149	0	0	0	-.1550E+06	.0000
OCT	343	0	0	0	-.2315E+06	.0000
NOV	498	0	0	0	-.3281E+06	.0000
DEC	662	0	2	0	-.4933E+06	.0000
YEAR	4018	0	2	0	-.4933E+06	.0000

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	185.47	.00	4.85	14.95	.00	25.82	12.2
FEB	147.56	.00	4.33	13.33	.00	23.04	12.2
MAR	124.16	.00	4.78	14.73	.00	25.45	12.2
APR	62.38	.00	4.61	14.19	.00	24.52	12.2
MAY	25.79	.00	4.85	14.95	.00	25.82	12.2
JUN	6.62	.00	4.61	14.19	.00	24.52	12.2
JUL	3.08	.00	4.78	14.73	.00	25.45	12.2
AUG	3.49	.00	4.85	14.95	.00	25.82	12.2
SEP	23.63	.00	4.54	13.98	.00	24.15	12.2
OCT	60.16	.00	4.85	14.95	.00	25.82	12.2
NOV	104.84	.00	4.68	14.41	.00	24.89	12.2
DEC	180.99	.00	4.71	14.52	.00	25.08	12.2
YEAR	928.16	.00	56.42	173.89	.00	300.40	12.2

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 109148. BTU/(SQFT-YEAR)



BLDG 655 - ADMINISTRATION / SUPPLY BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX SYSTEM TEMP. DRIFT DEG. F + -	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0. 0.	0 0	.0000	-.4601E+06
FEB	1421.	901.	1.000	37.	0. 0.	0 0	.0000	-.4023E+06
MAR	1864.	1216.	1.000	43.	0. 0.	0 0	.0000	-.3972E+06
APR	2242.	1552.	1.000	55.	0. 0.	0 0	.0000	-.2511E+06
MAY	2489.	1771.	1.000	65.	0. 0.	0 0	.0000	-.1746E+06
JUN	2567.	1933.	1.000	72.	0. 0.	0 0	.0000	-.7681E+05
JUL	2470.	1954.	1.000	77.	0. 0.	0 0	.0000	-.6304E+05
AUG	2211.	1784.	1.000	76.	0. 0.	0 0	.0000	-.8032E+05
SEP	1800.	1330.	1.000	68.	0. 0.	0 0	.0000	-.1550E+06
OCT	1394.	924.	1.000	57.	0. 0.	0 0	.0000	-.2315E+06
NOV	1008.	710.	1.000	47.	0. 0.	0 0	.0000	-.3281E+06
DEC	856.	586.	1.000	35.	0. 0.	0 2	.0000	-.4933E+06

BLDG 655 - ADMINISTRATION / SUPPLY NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 6.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 1.000000

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 146321.000000

FLOOR AREA (SQFT) 11861.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 493300.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 118610.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 896.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 3.670000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 22638.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 442.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 157.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	2197.0	476.0	2252.0	729.0
WINDOW AREA SQFT (AWND)	976.0	.0	310.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	.0	10.0	.0
WINDOW WIDTH FT (WNDW)	97.6	.0	31.0	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	11869.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	3.700000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	7.043545E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.713E-05	.105E-02	.391E-02	.193E-02
			.143E-03	712.
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.18	.410	-.444E-01
				.500E-03
				999.
SKYLIGHT TILT DEGREES (TILT)				0.000000E+00
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)				9999.000000
SKYLIGHT HEIGHT FT (SKH)				0.000000E+00
SKYLIGHT WIDTH FT (SKW)				0.000000E+00
SKYLIGHT OVERHANG WIDTH FT (SKOW)				0.000000E+00
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)				0.000000E+00
SKYLIGHT GLASS NUMBER (NS)				1
SKYLIGHT SHADING COEFFICIENT (SHSK)				0.000000E+00
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)				0.000000E+00
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)				1.292998
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)				1.292998
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)				4.500000E-01
WEEKEND COOLING THERMOSTAT PROFILE				
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0
70.0	70.0	70.0	70.0	70.0
70.0	70.0	55.0	55.0	55.0

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	BTU/HR				THERMOSTAT SET	
	PEOPLE		PEOPLE		POINT DEG F	
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING	

PEAK VAL	12.	19279.	7500.	6000.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.050	.000	.000	55.0		.0
2	.100	.050	.000	.000	55.0		.0
3	.100	.050	.000	.000	55.0		.0
4	.100	.050	.000	.000	55.0		.0
5	.400	.400	.200	.200	55.0		.0
6	1.000	.800	1.000	1.000	70.0		.0
7	1.000	.800	1.000	1.000	70.0		.0
8	1.000	.800	1.000	1.000	70.0		.0
9	1.000	1.000	1.000	1.000	70.0		.0
10	1.000	1.000	1.000	1.000	70.0		.0
11	1.000	1.000	.800	.800	70.0		.0
12	1.000	.700	.400	.400	70.0		.0
13	1.000	1.000	.800	.800	70.0		.0
14	1.000	1.000	1.000	1.000	70.0		.0
15	1.000	1.000	1.000	1.000	70.0		.0
16	1.000	1.000	1.000	1.000	70.0		.0
17	1.000	.800	1.000	1.000	70.0		.0
18	.800	.600	.800	.800	70.0		.0
19	.200	.200	.200	.200	55.0		.0
20	.100	.050	.000	.000	55.0		.0
21	.100	.050	.000	.000	55.0		.0
22	.100	.050	.000	.000	55.0		.0
23	.100	.050	.000	.000	55.0		.0
24	.100	.050	.000	.000	55.0		.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					0.000000E+00		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					8.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					493300.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					616625.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 655 - ADMINISTRATION / SUPPLY NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD		SOLAR	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
		THRU WINDOW							
JAN	.00 GAIN	21.02	.00	.00	.00	.00	.00	.00	.00
	-94.92 LOSS		-10.87	-13.13	.00	-23.06	-14.84	-80.21	.00
FEB	.00 GAIN	23.72	.00	.00	.00	.01	.00	.00	.00
	-71.98 LOSS		-9.00	-11.23	.00	-17.03	-12.74	-68.76	.00
MAR	.00 GAIN	29.45	.00	.00	.00	.26	.00	.00	.00
	-53.96 LOSS		-8.33	-10.90	.00	-13.44	-12.35	-64.10	.00
APR	.00 GAIN	28.22	.00	.00	.00	.74	.00	.02	.00
	-20.48 LOSS		-5.63	-7.87	.00	-7.10	-9.00	-43.90	.00
MAY	.00 GAIN	30.73	.00	.00	.00	.98	.01	.02	.00
	-5.32 LOSS		-5.02	-7.56	.00	-5.66	-8.29	-36.26	.00
JUN	.00 GAIN	30.87	.00	.00	.00	1.30	.00	.00	.00
	-.72 LOSS		-4.35	-6.96	.00	-4.52	-7.70	-33.78	.00
JUL	.00 GAIN	31.21	.00	.01	.00	1.33	.01	.06	.00
	-.25 LOSS		-4.32	-7.02	.00	-4.62	-7.82	-34.47	.00
AUG	.00 GAIN	27.85	.01	.00	.00	1.01	.00	.01	.00
	-.56 LOSS		-4.43	-6.80	.00	-5.13	-7.46	-31.65	.00
SEP	.00 GAIN	25.12	.00	.01	.00	.82	.01	.04	.00
	-5.22 LOSS		-4.80	-6.34	.00	-5.41	-7.12	-32.27	.00
OCT	.00 GAIN	23.46	.00	.01	.00	.14	.01	.03	.00
	-17.08 LOSS		-6.16	-7.31	.00	-8.41	-8.11	-36.55	.00
NOV	.00 GAIN	20.32	.00	.00	.00	.01	.00	.00	.00
	-41.08 LOSS		-7.56	-8.82	.00	-13.22	-9.79	-46.93	.00
DEC	.00 GAIN	19.31	.00	.00	.00	.00	.00	.00	.00
	-91.67 LOSS		-10.74	-12.77	.00	-23.00	-14.27	-75.28	.00
TOT	0. GAIN	311.	0.	0.	0.	7.	0.	0.	0.
	-403. LOSS		-81.	-107.	0.	-131.	-119.	-584.	0.

MAX HEATING LOAD= -493300. BTUH ON DEC 18 HOUR 7 AMBIENT TEMP -1.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 2778.7

BLDG 655 - ADMINISTRATION / SUPPLY NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	64.	86.	54.	5 29	16 4	61. 11.	4.85	14.95	.00	25.82
FEB	65.	87.	54.	13 2	16 4	68. 14.	4.33	13.33	.00	23.04
MAR	68.	104.	54.	28 4	16 4	76. 15.	4.78	14.73	.00	25.45
APR	74.	108.	55.	30 9	16 4	84. 31.	4.61	14.19	.00	24.52
MAY	82.	115.	55.	29 11	16 4	85. 38.	4.85	14.95	.00	25.82
JUN	89.	119.	60.	29 17	16 5	87. 56.	4.61	14.19	.00	24.52
JUL	93.	125.	63.	31 10	16 5	95. 57.	4.78	14.73	.00	25.45
AUG	91.	120.	60.	29 25	16 5	95. 52.	4.85	14.95	.00	25.82
SEP	83.	117.	55.	7 15	16 4	86. 41.	4.54	13.98	.00	24.15
OCT	73.	112.	55.	4 28	16 4	81. 30.	4.85	14.95	.00	25.82
NOV	68.	100.	54.	8 3	16 4	75. 17.	4.68	14.41	.00	24.89
DEC	64.	85.	54.	23 18	16 4	67. 1.	4.71	14.52	.00	25.08
YEAR							56.42	173.89	.00	300.40

BLDG 655 - ADMINISTRATION / SUPPLY NIGHT SETBACK (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	600	0	4	0	-.4933E+06	.0000
FEB	476	0	0	0	-.4927E+06	.0000
MAR	410	0	2	0	-.4933E+06	.0000
APR	201	0	0	0	-.3886E+06	.0000
MAY	62	0	0	0	-.3039E+06	.0000
JUN	13	0	0	0	-.1613E+06	.0000
JUL	5	0	0	0	-.8738E+05	.0000
AUG	8	0	0	0	-.2039E+06	.0000
SEP	64	0	0	0	-.3271E+06	.0000
OCT	199	0	0	0	-.3743E+06	.0000
NOV	366	0	0	0	-.4671E+06	.0000
DEC	597	0	3	0	-.4933E+06	.0000
YEAR	3001	0	9	0	-.4933E+06	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	143.86	.00	4.85	14.95	.00	25.82	12.2
FEB	110.87	.00	4.33	13.33	.00	23.04	12.2
MAR	86.86	.00	4.78	14.73	.00	25.45	12.2
APR	36.81	.00	4.61	14.19	.00	24.52	12.2
MAY	10.44	.00	4.85	14.95	.00	25.82	12.2
JUN	1.90	.00	4.61	14.19	.00	24.52	12.2
JUL	.64	.00	4.78	14.73	.00	25.45	12.2
AUG	1.23	.00	4.85	14.95	.00	25.82	12.2
SEP	10.72	.00	4.54	13.98	.00	24.15	12.2
OCT	33.60	.00	4.85	14.95	.00	25.82	12.2
NOV	70.78	.00	4.68	14.41	.00	24.89	12.2
DEC	140.12	.00	4.71	14.52	.00	25.08	12.2
YEAR	647.84	.00	56.42	173.89	.00	300.40	12.2

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR

85514. BTU/(SQFT-YEAR)



BLDG 655 - ADMINISTRATION / SUPPLY NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT-	HORIZ. SURF. BTU/ SQFT-					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	4	.0000	-.4933E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.4927E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	2	.0000	-.4933E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.3886E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.3039E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	-.1613E+06
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	-.8738E+05
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	-.2039E+06
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.3271E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.3743E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.4671E+06
DEC	856.	586.	1.000	35.	0.	0.	0	3	.0000	-.4933E+06

BLDG 655 - ADMINISTRATION / SUPPLY DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 6.000000E-01  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 1.000000

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 146321.000000

FLOOR AREA (SQFT) 11861.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 493300.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 118610.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 896.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 3.670000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 22638.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 442.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 157.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	2197.0	476.0	2252.0	729.0
WINDOW AREA SQFT (AWND)	976.0	.0	310.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	.0	10.0	.0
WINDOW WIDTH FT (WNDW)	97.6	.0	31.0	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	11869.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	3.700000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	7.043545E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.713E-05	.105E-02	.391E-02	.193E-02 .143E-03 712.
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.18	.410	-.444E-01 .500E-03 999.
SKYLIGHT TILT DEGREES (TILT)				0.000000E+00
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)				9999.000000
SKYLIGHT HEIGHT FT (SKH)				0.000000E+00
SKYLIGHT WIDTH FT (SKW)				0.000000E+00
SKYLIGHT OVERHANG WIDTH FT (SKOW)				0.000000E+00
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)				0.000000E+00
SKYLIGHT GLASS NUMBER (NS)				1
SKYLIGHT SHADING COEFFICIENT (SHSK)				0.000000E+00
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)				0.000000E+00
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)				1.292998
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)				1.292998
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)				4.500000E-01
WEEKEND COOLING THERMOSTAT PROFILE				
.000	.000	.000	.000	.000 .000 .000
.000	.000	.000	.000	.000 .000 .000
.000	.000	.000	.000	.000 .000 .000
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0 68.0 68.0 68.0
68.0	68.0	68.0	68.0	68.0 68.0 68.0 68.0
68.0	68.0	55.0	55.0	55.0 55.0 55.0 55.0

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	- - - - -	BTU/HR	- - - - -		
		PEOPLE	PEOPLE		
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	12.	19279.	7500.	6000.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.050	.000	.000	55.0		.0
2	.100	.050	.000	.000	55.0		.0
3	.100	.050	.000	.000	55.0		.0
4	.100	.050	.000	.000	55.0		.0
5	.400	.400	.200	.200	55.0		.0
6	1.000	.800	1.000	1.000	68.0		.0
7	1.000	.800	1.000	1.000	68.0		.0
8	1.000	.800	1.000	1.000	68.0		.0
9	1.000	1.000	1.000	1.000	68.0		.0
10	1.000	1.000	1.000	1.000	68.0		.0
11	1.000	1.000	.800	.800	68.0		.0
12	1.000	.700	.400	.400	68.0		.0
13	1.000	1.000	.800	.800	68.0		.0
14	1.000	1.000	1.000	1.000	68.0		.0
15	1.000	1.000	1.000	1.000	68.0		.0
16	1.000	1.000	1.000	1.000	68.0		.0
17	1.000	.800	1.000	1.000	68.0		.0
18	.800	.600	.800	.800	68.0		.0
19	.200	.200	.200	.200	55.0		.0
20	.100	.050	.000	.000	55.0		.0
21	.100	.050	.000	.000	55.0		.0
22	.100	.050	.000	.000	55.0		.0
23	.100	.050	.000	.000	55.0		.0
24	.100	.050	.000	.000	55.0		.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)				68.000000			
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)				100.000000			
SYSTEM TYPE, (IECN)				2			
SUPPLY AIR CFM (SACFM)				0.000000E+00			
ECONOMIZER HIGH TEMP LIMIT F				100.000000			
SYSTEM SUPPLY AIR START TIME HR				0.000000E+00			
SYSTEM SUPPLY AIR STOP TIME HR				24.000000			
SYSTEM MIXED AIR TEMP(TMXAIR)				55.000000			
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)				0.000000E+00			
FAN EFFICIENCY (EFAN)				5.500000E-01			
FAN TOTAL PRESSURE IN. WATER (DP)				8.000000E-01			
HEATING PLANT RATED OUTPUT BTU (HFLOT)				493300.000000			
HEATING PLANT RATED INPUT BTU (HFLIN)				616625.000000			
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)				4			
COOLING PLANT RATED OUTPUT BTU (CFLOT)				1.000000E-10			
COOLING PLANT RATED INPUT BTU (CFLIN)				0.000000E+00			
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 655 - ADMINISTRATION / SUPPLY DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00 GAIN	21.02	.00	.00	.00	.00	.00	.00	.00
	-89.49 LOSS		-10.55	-12.70	.00	-22.07	-14.36	-77.00	.00
FEB	.00 GAIN	23.72	.00	.00	.00	.01	.00	.00	.00
	-67.65 LOSS		-8.75	-10.89	.00	-16.25	-12.35	-66.19	.00
MAR	.00 GAIN	29.45	.00	.00	.00	.31	.00	.00	.00
	-50.17 LOSS		-8.11	-10.60	.00	-12.79	-12.00	-61.89	.00
APR	.00 GAIN	28.22	.00	.00	.00	.83	.00	.02	.00
	-18.31 LOSS		-5.49	-7.68	.00	-6.74	-8.78	-42.70	.00
MAY	.00 GAIN	30.73	.00	.01	.00	1.08	.01	.03	.00
	-4.17 LOSS		-4.94	-7.44	.00	-5.49	-8.17	-35.71	.00
JUN	.00 GAIN	30.87	.00	.00	.00	1.34	.00	.00	.00
	-.39 LOSS		-4.32	-6.93	.00	-4.48	-7.66	-33.63	.00
JUL	.00 GAIN	31.21	.00	.02	.00	1.34	.02	.07	.00
	-.08 LOSS		-4.31	-7.01	.00	-4.60	-7.81	-34.41	.00
AUG	.00 GAIN	27.85	.01	.00	.00	1.03	.00	.01	.00
	-.35 LOSS		-4.42	-6.78	.00	-5.11	-7.44	-31.55	.00
SEP	.00 GAIN	25.12	.00	.01	.00	.86	.01	.04	.00
	-4.46 LOSS		-4.74	-6.26	.00	-5.28	-7.03	-31.89	.00
OCT	.00 GAIN	23.46	.00	.01	.00	.17	.01	.02	.00
	-15.11 LOSS		-6.03	-7.13	.00	-8.03	-7.91	-35.51	.00
NOV	.00 GAIN	20.32	.00	.00	.00	.02	.00	.00	.00
	-37.65 LOSS		-7.34	-8.53	.00	-12.55	-9.46	-45.03	.00
DEC	.00 GAIN	19.31	.00	.00	.00	.00	.00	.00	.00
	-86.39 LOSS		-10.43	-12.34	.00	-22.02	-13.79	-72.20	.00
TOT	0. GAIN	311.	0.	0.	0.	7.	0.	0.	0.
	-374. LOSS		-79.	-104.	0.	-125.	-117.	-568.	0.

MAX HEATING LOAD= -493300. BTUH ON DEC 18 HOUR 6 AMBIENT TEMP 0.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 2778.7

BLDG 655 - ADMINISTRATION / SUPPLY DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	63.	86.	54.	5 29	16 4	61. 11.	4.85	14.95	.00	25.82
FEB	64.	87.	54.	13 2	16 4	68. 14.	4.33	13.33	.00	23.04
MAR	67.	104.	54.	28 4	16 4	76. 15.	4.78	14.73	.00	25.45
APR	74.	108.	55.	30 9	16 4	84. 31.	4.61	14.19	.00	24.52
MAY	82.	115.	55.	29 11	16 4	85. 38.	4.85	14.95	.00	25.82
JUN	89.	119.	60.	29 17	16 5	87. 56.	4.61	14.19	.00	24.52
JUL	93.	125.	63.	31 10	16 5	95. 57.	4.78	14.73	.00	25.45
AUG	91.	120.	60.	29 25	16 5	95. 52.	4.85	14.95	.00	25.82
SEP	83.	117.	55.	7 15	16 4	86. 41.	4.54	13.98	.00	24.15
OCT	73.	112.	55.	4 28	16 4	81. 30.	4.85	14.95	.00	25.82
NOV	67.	100.	54.	8 3	16 4	75. 17.	4.68	14.41	.00	24.89
DEC	63.	85.	54.	23 18	16 4	67. 1.	4.71	14.52	.00	25.08
YEAR							56.42	173.89	.00	300.40

BLDG 655 - ADMINISTRATION / SUPPLY DDC (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	595	0	2	0	-.4933E+06	.0000
FEB	469	0	0	0	-.4550E+06	.0000
MAR	399	0	0	0	-.4839E+06	.0000
APR	185	0	0	0	-.3512E+06	.0000
MAY	56	0	0	0	-.2666E+06	.0000
JUN	5	0	0	0	-.1237E+06	.0000
JUL	4	0	0	0	-.5009E+05	.0000
AUG	6	0	0	0	-.1666E+06	.0000
SEP	60	0	0	0	-.2898E+06	.0000
OCT	181	0	0	0	-.3368E+06	.0000
NOV	345	0	0	0	-.4294E+06	.0000
DEC	596	0	1	0	-.4933E+06	.0000
YEAR	2901	0	3	0	-.4933E+06	.0000

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	138.03	.00	4.85	14.95	.00	25.82	12.2
FEB	105.70	.00	4.33	13.33	.00	23.04	12.2
MAR	82.04	.00	4.78	14.73	.00	25.45	12.2
APR	33.09	.00	4.61	14.19	.00	24.52	12.2
MAY	8.76	.00	4.85	14.95	.00	25.82	12.2
JUN	.79	.00	4.61	14.19	.00	24.52	12.2
JUL	.47	.00	4.78	14.73	.00	25.45	12.2
AUG	.91	.00	4.85	14.95	.00	25.82	12.2
SEP	9.56	.00	4.54	13.98	.00	24.15	12.2
OCT	29.86	.00	4.85	14.95	.00	25.82	12.2
NOV	65.44	.00	4.68	14.41	.00	24.89	12.2
DEC	134.74	.00	4.71	14.52	.00	25.08	12.2
YEAR	609.38	.00	56.42	173.89	.00	300.40	12.2

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 82272. BTU/(SQFT-YEAR)



BLDG 655 - ADMINISTRATION / SUPPLY DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG.	MAX	SYSTEM	HOURS WHEN		MAXIMUM	MAXIMUM
	INSOL. HORIZ. SURF. BTU/ SQFT-DAY	SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-DAY		AMBT. DEG. F	TEMP. DEG. F	DRIFT DEG. F	SYSTEM LOADS NOT MET COOL HEAT	COOLING LOAD BTU	HEATING LOAD BTU	
JAN	1010.	655.	1.000	35.	0.	0.	0	2	.0000	-.4933E+06
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.4550E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.4839E+06
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.3512E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.2666E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	-.1237E+06
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	-.5009E+05
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	-.1666E+06
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2898E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.3368E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.4294E+06
DEC	856.	586.	1.000	35.	0.	0.	0	1	.0000	-.4933E+06

**COMPUTER SIMULATIONS**

BUILDING 672

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 672  
BLDG. TYPE: MOTOR POOL

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1103.2	737.6	719.4			
COOLING (kWH)						

SUPPLY AIR FAN	4400 CFM
FLOOR AREA	4800 FT <sup>2</sup>
CFMI	1320 CFM
UA	4857 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	700	1700	50 HR	HR. ON HEATING 1300 HR/YR
SAT.	0	0	0 HR	HR. ON COOLING 871 HR/YR
SUN.	0	0	0 HR	HR. OFF HEATING 3068 HR/YR
	TOTAL OCCUPY HR.		50 HR/WK	HR. OFF COOLING 2057 HR/YR
	TOTAL UNOCC. HR.		118 HR/WK	
	ANNUAL OCCUPY HR.		2607 HR/YR	
	ANNUAL UNOCC. HR.		6153 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 1300 = 3068 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 871 = 2057 HR/YR

HOAUHC	1103.16 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1320 CFM *	6153 HR/YR		
HOAUH	1103.16 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1320 CFM *	3068 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1320 CFM *	6153 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1320 CFM *	2057 HR/YR		
HOAOHC	1103.16 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1320 CFM *	2607 HR/YR		
HOAOH	1103.16 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1320 CFM *	1300 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1320 CFM *	2607 HR/YR		
COAOC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	1320 CFM *	871 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 672  
BLDG. TYPE: MOTOR POOL

**ENERGY CONSTANT CALCULATIONS**

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4400 CFM *	871 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4400 CFM *	2607 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4400 CFM *	6153 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4400 CFM *	2057 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4400 CFM *	2607 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	4400 CFM *	871 HR/YR		
NSC	1103.16 MBtu -	737.55 MBtu	=	7.53E+04 Btu/UA
	4857 UA			
DSC	737.55 MBtu -	719.43 MBtu	=	3.73E+03 Btu/UA
	4857 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 672BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 672 BLDG NAME: MOTOR POOL

BLDG FUNCTION: VEHICLE MAINTENANCE

FLOOR AREA: (SQ. FT) 4,800

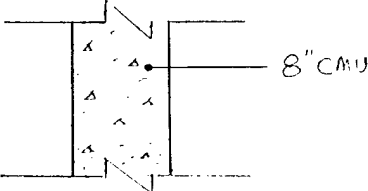
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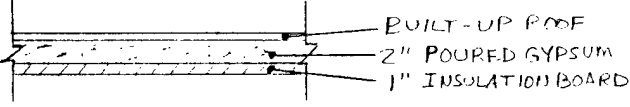
SLAB PERIMETER: (FT) 321

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	583	583	1,770	1,770	4,706
GLASS	(SQ. FT)	42	142	179	142	505
PERSONNEL DOOR,	(SQ. FT)	0	0	21	21	42
OVERHEAD DOOR,	(SQ. FT)	0	0	432	576	1,008
WALLS, NET	(SQ. FT)	541	441	1,138	1,031	2,324
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 4,800
OVERHEAD DOOR	(SQ. FT)	1,008	PERSONNEL DOOR		(SQ. FT)	42
INSULATED PANEL	(SQ. FT)	378	147	160	142	827

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)	COMPONENTS	R-VALUE
	1. OUTSIDE AIR FILM	0.17
	2. 8" CMU	2.02
	3.	
	4.	
	5.	
	6.	
	7. INSIDE AIR FILM	0.68
	TOTAL R-WALL =	2.87
	U=1/R	0.348

ROOF: (SKETCH CROSS SECTION OF ROOF)	COMPONENTS	R-VALUE
	1. OUTSIDE AIR FILM	0.17
	2. BUILT UP ROOF	0.34
	3. 2" POURED GYPSUM	1.80
	4. 1" INSULATION BOARD	3.33
	5.	
	6.	
	7. INSIDE AIR FILM	0.68
	TOTAL R-ROOF =	6.32
	U=1/R	0.158

GLASS TYPE:	'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
INSULATED PANEL:		R-PANEL	4.20
OVERHEAD DOOR TYPE:	METAL (NO INSULATION)	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)	H	4706	X CFM / SQ.FT.	0.277	= 1,304
DOOR OPENINGS / HR - SINGLE DOOR	10	X CFM / OPENING / HR	1.600	=	16
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING / HR	1.385	=	0
TOTAL INFILTRATION (CFM)					1320

UA ODOOR	= ODOOR AREA	1,008	X ODOOR 'U'	0.952	=	960
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	2,324	X WALL 'U'	0.348	=	810
UA ROOF	= ROOF AREA	4,800	X ROOF 'U'	0.158	=	760
UA GLASS	= GLASS AREA	505	X GLASS 'U'	0.621	=	314
UA SLAB	= SLAB PERIM.	321	X SLF	0.830	=	266
UA PANEL	= PANEL AREA	827	X PANEL 'U'	0.238	=	197
INFILTRATION	= CFM	1320	X A. T. F.	1.035	=	1,366
TOTAL UA (BTU/HR°F)						4,689

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 27-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 672Z1  
 BLDG: 672 ZONE: 1

## **Rates of Heat Gain from Occupants of Conditioned Spaces**

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat (BTU/H)
1	9	7	Walking, 3mph, light machine work	Factory	375	625	3,375	5,625
TOTAL	9					TOTAL	3,375	5,625

## **Peak Wattage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	42	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	3,528
	3	7	Fluorescent, 3 - 34w lamps, 16w ballast (2x4 ft. fixture)	118	354
	6	18	Incandescent - 60w	60	360
TOTAL	51			TOTAL	4,242

## **Peak Value for Internal Gains**

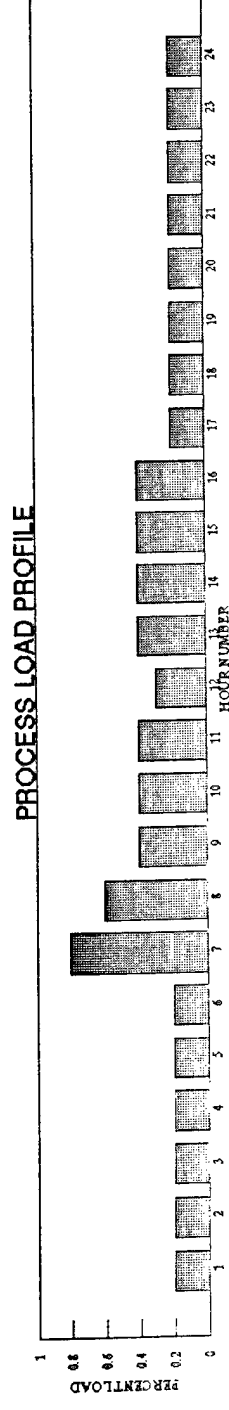
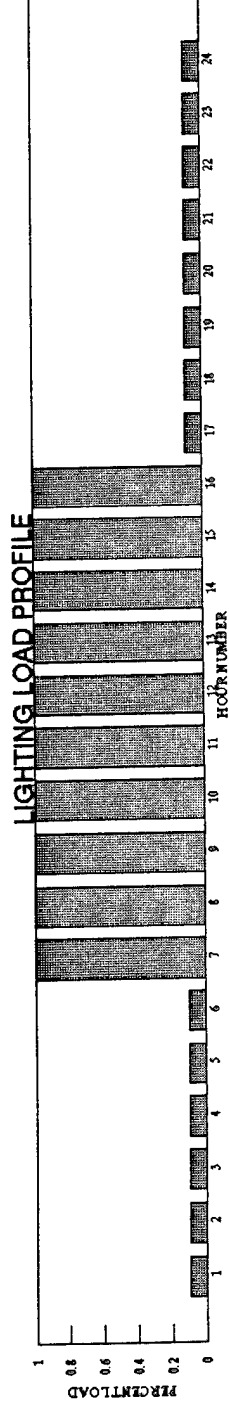
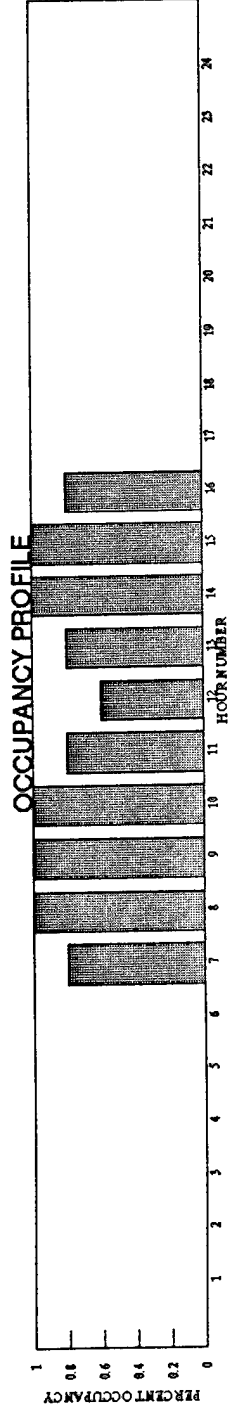
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
1	1	53	Refrigerator (12 cu. ft.)	241	20%	241	823
	1	46	Microwave Oven	600	65%	600	2,048
	1	24	Coffee Maker	1,500	30%	1,500	5,120
	1	25	Cold Food/Beverage	1,535	50%	1,535	5,239
	1	62	Television (Color, tube)	300	15%	300	1,024
TOTAL				TOTAL	41%	4,176	14,253

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204 -000  
 DATE: 27 -Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 672Z1  
 BLDG: 672  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
5	Motor Pool	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.8	1	1	1	0.8	0.6	0.8	1	1	1	0.8								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.2	0.2	0.2	0.2	0.2	0.8	0.6	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2



BLDG 672 - MOTOR POOL BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 0.000000E+00  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=1 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 1.000000

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 70368.000000

FLOOR AREA (SQFT) 4800.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 334239.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 334239.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 1320.000000

INFILTRATION PROFILE

.500	.500	.500	.500	.500	.500	.500	.500
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.500	.500	.500	.500	.500	.500	.500	.500

A FACTOR IN INFILTRATION EQUATION (CINA) 1.126000

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 2760.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 266.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 976.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	588.0	1173.0	919.0	1298.0
WINDOW AREA SQFT (AWND)	142.0	142.0	42.0	179.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	14.2	14.2	4.2	17.9
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.321	.335	.303	.334
WALL TRANSFER FUNCTIONS				
CN FACTORS	.05164	.05390	.04875	.05374
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00022	.00023	.00021	.00023
N=2	.01343	.01402	.01268	.01397
N=3	.02959	.03088	.02793	.03079
N=4	.00819	.00855	.00773	.00852
N=5	.00022	.00023	.00021	.00023
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.16550	-1.16550	-1.16550	-1.16550
N=3	.35090	.35090	.35090	.35090
N=4	-.02450	-.02450	-.02450	-.02450
N=5	.00020	.00020	.00020	.00020
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4800.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.580000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.314657E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.482E-03 .687E-02 .543E-02 .362E-03 .120E+04 .120E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.10 .189 -.180E-02 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		4.100000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
					HEATING	COOLING
PEAK VAL	KW	BTU/HR	PEOPLE	PEOPLE		
	LIGHTS	PROCESS	SENSIBLE	LATENT		
	4.	5844.	3375.	5625.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.200	.000	.000	70.0	.0
2	.100	.200	.000	.000	70.0	.0
3	.100	.200	.000	.000	70.0	.0
4	.100	.200	.000	.000	70.0	.0
5	.100	.200	.000	.000	70.0	.0
6	.100	.200	.000	.000	70.0	.0
7	1.000	.800	.800	.800	70.0	.0
8	1.000	.600	1.000	1.000	70.0	.0
9	1.000	.400	1.000	1.000	70.0	.0
10	1.000	.400	1.000	1.000	70.0	.0
11	1.000	.400	.800	.800	70.0	.0
12	1.000	.300	.600	.600	70.0	.0

13	1.000	.400	.800	.800	70.0	.0
14	1.000	.400	1.000	1.000	70.0	.0
15	1.000	.400	1.000	1.000	70.0	.0
16	1.000	.400	1.000	1.000	70.0	.0
17	.100	.200	.000	.000	70.0	.0
18	.100	.200	.000	.000	70.0	.0
19	.100	.200	.000	.000	70.0	.0
20	.100	.200	.000	.000	70.0	.0
21	.100	.200	.000	.000	70.0	.0
22	.100	.200	.000	.000	70.0	.0
23	.100	.200	.000	.000	70.0	.0
24	.100	.200	.000	.000	70.0	.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000	
SYSTEM TYPE, (IECN)					0	
SUPPLY AIR CFM (SACFM)					4400.000000	
ECONOMIZER HIGH TEMP LIMIT F					68.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					334239.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					417800.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.210	.200	.300	.300	.500	.400 .510
.500	.590	.600	.680	.700	.770	.800 .840
.900	.910	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10	
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000	.000	.000	.000 .000
.000	.000	.000	.000			

BLDG 672 - MOTOR POOL BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	8.	0.	0.	0.	0.	0.	0.	0.
	-157.	LOSS		-21.	-32.	0.	-27.	-7.	-84.	0.
FEB	0.	GAIN	10.	0.	0.	0.	0.	0.	0.	0.
	-127.	LOSS		-18.	-27.	0.	-20.	-6.	-72.	0.
MAR	0.	GAIN	12.	0.	0.	0.	2.	0.	0.	0.
	-108.	LOSS		-16.	-25.	0.	-17.	-5.	-65.	0.
APR	.00	GAIN	12.22	.00	.00	.00	3.77	.00	.01	.00
	-52.51	LOSS		-9.41	-15.73	.00	-8.17	-3.38	-38.14	.00
MAY	.00	GAIN	13.30	.00	.00	.00	5.59	.00	.01	.00
	-19.05	LOSS		-5.38	-10.56	.00	-3.37	-2.19	-23.15	.00
JUN	.00	GAIN	13.31	.01	.07	.00	6.38	.01	.13	.00
	-3.85	LOSS		-3.08	-7.49	.00	-7.79	-1.57	-16.85	.00
JUL	.00	GAIN	13.61	.02	.12	.00	6.41	.03	.24	.00
	-1.95	LOSS		-2.81	-7.27	.00	-4.49	-1.54	-16.56	.00
AUG	.00	GAIN	12.06	.01	.09	.00	5.51	.02	.18	.00
	-2.23	LOSS		-2.96	-6.74	.00	-5.56	-1.41	-15.03	.00
SEP	.00	GAIN	10.60	.00	.13	.00	4.18	.03	.27	.00
	-16.65	LOSS		-5.12	-8.42	.00	-3.00	-1.79	-19.32	.00
OCT	.00	GAIN	9.06	.00	.03	.00	2.06	.01	.07	.00
	-49.24	LOSS		-9.81	-13.99	.00	-8.62	-2.93	-31.94	.00
NOV	.00	GAIN	7.38	.00	.01	.00	.65	.00	.03	.00
	-89.69	LOSS		-14.27	-20.51	.00	-15.75	-4.30	-49.53	.00
DEC	0.	GAIN	7.	0.	0.	0.	0.	0.	0.	0.
	-154.	LOSS		-21.	-31.	0.	-27.	-7.	-81.	0.
TOT	0.	GAIN	128.	0.	0.	0.	37.	0.	1.	0.
	-782.	LOSS		-130.	-207.	0.	-132.	-44.	-513.	0.

MAX HEATING LOAD= -334239. BTUH ON DEC 27 HOUR 4      AMBIENT TEMP 18.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F

3341.2

BLDG 672 - MOTOR POOL BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	69.	77.	50.	5 27	15 5	64. 5.	1.11	2.39	1.43	6.91
FEB	69.	76.	58.	13 2	15 3	65. 15.	.97	2.08	1.29	6.05
MAR	70.	97.	58.	12 3	14 9	73. 17.	1.06	2.29	1.39	6.62
APR	73.	103.	66.	24 2	15 24	81. 66.	1.02	2.18	1.31	6.31
MAY	77.	105.	66.	29 5	13 22	85. 66.	1.11	2.39	1.22	6.70
JUN	81.	110.	61.	29 10	14 5	88. 66.	1.02	2.18	1.06	6.06
JUL	85.	117.	62.	6 24	14 6	92. 66.	1.06	2.29	1.06	6.29
AUG	83.	111.	64.	29 5	14 6	96. 66.	1.11	2.39	1.12	6.60
SEP	77.	115.	62.	24 30	15 10	85. 66.	.97	2.08	1.03	5.80
OCT	72.	99.	61.	4 24	12 4	83. 66.	1.11	2.39	1.33	6.80
NOV	70.	93.	60.	8 16	13 17	77. 67.	1.06	2.29	1.37	6.61
DEC	69.	73.	40.	23 18	15 9	70. 3.	1.02	2.18	1.42	6.42
YEAR							12.62	27.16	15.04	77.18

BLDG 672 - MOTOR POOL BASERUN (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	740	0	39	0	-.3342E+06	.0000
FEB	668	0	29	0	-.3342E+06	.0000
MAR	688	0	12	0	-.3342E+06	.0000
APR	509	0	0	0	-.2456E+06	.0000
MAY	371	0	0	0	-.1788E+06	.0000
JUN	122	0	0	0	-.7598E+05	.0000
JUL	71	0	0	0	-.6325E+05	.0000
AUG	65	0	0	0	-.9528E+05	.0000
SEP	227	0	0	0	-.1739E+06	.0000
OCT	539	0	0	0	-.2343E+06	.0000
NOV	647	0	0	0	-.3300E+06	.0000
DEC	740	0	38	0	-.3342E+06	.0000
YEAR	5387	0	118	0	-.3342E+06	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	218.03	.00	1.11	2.39	.42	6.91	4.8
FEB	182.00	.00	.97	2.08	.38	6.05	4.8
MAR	163.63	.00	1.06	2.29	.41	6.62	4.8
APR	92.03	.00	1.02	2.18	.38	6.31	4.8
MAY	44.06	.00	1.11	2.39	.36	6.70	4.8
JUN	11.53	.00	1.02	2.18	.31	6.06	4.8
JUL	6.45	.00	1.06	2.29	.31	6.29	4.8
AUG	6.44	.00	1.11	2.39	.33	6.60	4.8
SEP	33.96	.00	.97	2.08	.30	5.80	4.8
OCT	91.03	.00	1.11	2.39	.39	6.80	4.8
NOV	140.87	.00	1.06	2.29	.40	6.61	4.8
DEC	215.57	.00	1.02	2.18	.42	6.42	4.8
YEAR	1205.60	.00	12.62	27.16	4.41	77.18	4.8

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 268932. BTU/(SQFT-YEAR)

BLDG 672 - MOTOR POOL BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS SYSTEM NOT COOL	WHEN LOADS MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	39	.0000	-.3342E+06
FEB	1464.	929.	1.000	37.	0.	0.	0	29	.0000	-.3342E+06
MAR	1922.	1254.	1.000	43.	0.	0.	0	12	.0000	-.3342E+06
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.2456E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.1788E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-.7598E+05
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	-.6325E+05
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	-.9528E+05
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.1739E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.2343E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.3300E+06
DEC	883.	604.	1.000	35.	0.	0.	0	38	.0000	-.3342E+06

BLDG 672 - MOTOR POOL NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 0.000000E+00  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 1.000000

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 70368.000000

FLOOR AREA (SQFT) 4800.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 334239.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 334239.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 1320.000000

## INFILTRATION PROFILE

.500	.500	.500	.500	.500	.500	.500	.500
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.500	.500	.500	.500	.500	.500	.500	.500

A FACTOR IN INFILTRATION EQUATION (CINA) 1.126000

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 2760.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 266.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 976.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	588.0	1173.0	919.0	1298.0
WINDOW AREA SQFT (AWND)	142.0	142.0	42.0	179.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	14.2	14.2	4.2	17.9
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.321	.335	.303	.334
WALL TRANSFER FUNCTIONS				
CN FACTORS	.05164	.05390	.04875	.05374
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00022	.00023	.00021	.00023
N=2	.01343	.01402	.01268	.01397
N=3	.02959	.03088	.02793	.03079
N=4	.00819	.00855	.00773	.00852
N=5	.00022	.00023	.00021	.00023
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.16550	-1.16550	-1.16550	-1.16550
N=3	.35090	.35090	.35090	.35090
N=4	-.02450	-.02450	-.02450	-.02450
N=5	.00020	.00020	.00020	.00020
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4800.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.580000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.314657E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.482E-03 .687E-02 .543E-02 .362E-03 .120E+04 .120E+04				
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.10 .189 -.180E-02 999. 999.				
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		4.100000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
90.0 90.0 90.0 90.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				
55.0 55.0 55.0 55.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	BTU/HR	PEOPLE	PEOPLE	HEATING	COOLING
LIGHTS	PROCESS	SENSIBLE	LATENT		

PEAK VAL	4.	5844.	3375.	5625.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.200	.000	.000	55.0		.0
2	.100	.200	.000	.000	55.0		.0
3	.100	.200	.000	.000	55.0		.0
4	.100	.200	.000	.000	55.0		.0
5	.100	.200	.000	.000	55.0		.0
6	.100	.200	.000	.000	55.0		.0
7	1.000	.800	.800	.800	55.0		.0
8	1.000	.600	1.000	1.000	70.0		.0
9	1.000	.400	1.000	1.000	70.0		.0
10	1.000	.400	1.000	1.000	70.0		.0
11	1.000	.400	.800	.800	70.0		.0
12	1.000	.300	.600	.600	70.0		.0
13	1.000	.400	.800	.800	70.0		.0
14	1.000	.400	1.000	1.000	70.0		.0
15	1.000	.400	1.000	1.000	70.0		.0
16	1.000	.400	1.000	1.000	70.0		.0
17	.100	.200	.000	.000	55.0		.0
18	.100	.200	.000	.000	55.0		.0
19	.100	.200	.000	.000	55.0		.0
20	.100	.200	.000	.000	55.0		.0
21	.100	.200	.000	.000	55.0		.0
22	.100	.200	.000	.000	55.0		.0
23	.100	.200	.000	.000	55.0		.0
24	.100	.200	.000	.000	55.0		.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					0		
SUPPLY AIR CFM (SACFM)					4400.000000		
ECONOMIZER HIGH TEMP LIMIT F					68.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					334239.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					417800.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.210	.200	.300	.300	.500	.400	.510
.500	.590	.600	.680	.700	.770	.800	.840
.900	.910	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 672 - MOTOR POOL NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -105.	GAIN LOSS	8. 8.	0. -16.	0. -23.	0. 0.	0. -17.	0. -5.	0. -59.	0. 0.
FEB	.00 -79.68	GAIN LOSS	9.58	.00 -12.67	.02 -18.70	.00 .00	1.06 -12.10	.00 -4.01	.04 -48.94	.00 .00
MAR	.00 -61.88	GAIN LOSS	11.92	.00 -10.78	.02 -16.91	.00 .00	2.75 -8.68	.01 -3.63	.05 -43.30	.00 .00
APR	.00 -19.93	GAIN LOSS	12.22	.00 -5.55	.05 -9.60	.00 .00	4.99 -2.91	.01 -2.07	.10 -23.54	.00 .00
MAY	.00 -2.76	GAIN LOSS	13.30	.01 -3.36	.09 -7.32	.00 .00	6.28 -.60	.02 -1.53	.17 -16.71	.00 .00
JUN	.00 .00	GAIN LOSS	13.31	.02 -2.63	.07 -6.75	.00 .00	6.54 -.16	.02 -1.42	.14 -15.50	.00 .00
JUL	.00 .00	GAIN LOSS	13.61	.02 -2.60	.15 -6.96	.00 .00	6.47 -.20	.03 -1.48	.30 -16.01	.00 .00
AUG	.00 -.03	GAIN LOSS	12.06	.01 -2.72	.09 -6.34	.00 .00	5.56 -.21	.02 -1.33	.17 -14.28	.00 .00
SEP	.00 -3.00	GAIN LOSS	10.60	.00 -3.56	.13 -5.75	.00 .00	4.59 -.69	.03 -1.23	.27 -13.57	.00 .00
OCT	.00 -17.88	GAIN LOSS	9.06	.00 -6.06	.08 -7.88	.00 .00	2.90 -3.05	.02 -1.65	.16 -18.35	.00 .00
NOV	.00 -47.10	GAIN LOSS	7.38	.00 -9.33	.05 -12.45	.00 .00	1.26 -7.94	.01 -2.61	.11 -30.19	.00 .00
DEC	0. -102.	GAIN LOSS	7.	0. -16.	0. -22.	0. 0.	1. -18.	0. -5.	0. -56.	0. 0.
TOT	0. -439.	GAIN LOSS	128.	0. -91.	1. -143.	0. 0.	43. -72.	0. -30.	2. -356.	0. 0.

MAX HEATING LOAD= -334239. BTUH ON DEC 19 HOUR 9 AMBIENT TEMP 21.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 3341.2

BLDG 672 - MOTOR POOL NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	59.	77.	54.	5 27	15 6	64. 4.	1.11	2.39	1.43	6.91
FEB	59.	79.	54.	13 2	15 6	65. 14.	.97	2.08	1.29	6.05
MAR	61.	95.	54.	12 4	14 6	73. 15.	1.06	2.29	1.43	6.67
APR	66.	106.	55.	24 9	13 6	80. 30.	1.02	2.18	1.38	6.38
MAY	73.	105.	55.	29 11	13 4	85. 38.	1.11	2.39	1.43	6.91
JUN	80.	110.	55.	29 17	14 3	88. 55.	1.02	2.18	1.38	6.38
JUL	85.	117.	57.	6 10	14 4	92. 57.	1.06	2.29	1.43	6.67
AUG	83.	111.	55.	29 25	14 6	96. 51.	1.11	2.39	1.43	6.91
SEP	75.	115.	55.	24 15	15 6	85. 39.	.97	2.08	1.38	6.15
OCT	65.	99.	55.	4 28	12 5	83. 31.	1.11	2.39	1.43	6.91
NOV	61.	93.	54.	8 3	13 7	77. 18.	1.06	2.29	1.38	6.62
DEC	59.	83.	47.	23 18	13 4	71. 1.	1.02	2.18	1.43	6.43
YEAR							12.62	27.16	16.85	78.99

BLDG 672 - MOTOR POOL NIGHT SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED						
MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	713	0	0	0	-.3342E+06	.0000
FEB	624	0	0	0	-.3250E+06	.0000
MAR	592	0	0	0	-.2775E+06	.0000
APR	338	0	0	0	-.1887E+06	.0000
MAY	101	0	0	0	-.8785E+05	.0000
JUN	2	0	0	0	-313.7	.0000
JUL	0	0	0	0	.0000	.0000
AUG	4	0	0	0	-.1554E+05	.0000
SEP	123	0	0	0	-.8312E+05	.0000
OCT	376	0	0	0	-.1380E+06	.0000
NOV	518	0	0	0	-.2350E+06	.0000
DEC	707	0	15	0	-.3342E+06	.0000
YEAR	4098	0	15	0	-.3342E+06	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	163.27	.00	1.11	2.39	.42	6.91	4.8	
FEB	129.48	.00	.97	2.08	.38	6.05	4.8	
MAR	108.10	.00	1.06	2.29	.42	6.67	4.8	
APR	45.17	.00	1.02	2.18	.41	6.38	4.8	
MAY	9.87	.00	1.11	2.39	.42	6.91	4.8	
JUN	.09	.00	1.02	2.18	.41	6.38	4.8	
JUL	.00	.00	1.06	2.29	.42	6.67	4.8	
AUG	.35	.00	1.11	2.39	.42	6.91	4.8	
SEP	11.45	.00	.97	2.08	.41	6.15	4.8	
OCT	44.50	.00	1.11	2.39	.42	6.91	4.8	
NOV	88.33	.00	1.06	2.29	.41	6.62	4.8	
DEC	158.72	.00	1.02	2.18	.42	6.43	4.8	
YEAR	759.31	.00	12.62	27.16	4.94	78.99	4.8	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 176331. BTU/(SQFT-YEAR)

BLDG 672 - MOTOR POOL NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT- DAY	INSOL. SURF. BTU/ SQFT- DAY					COOL	HEAT		
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.3342E+06
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.0000	-.3250E+06
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.0000	-.2775E+06
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.1887E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.8785E+05
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-313.7
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	-.1554E+05
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.8312E+05
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.1380E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.2350E+06
DEC	883.	604.	1.000	35.	0.	0.	0	15	.0000	-.3342E+06

BLDG 672 - MOTOR POOL DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 0.000000E+00  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 1.000000

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 70368.000000

FLOOR AREA (SQFT) 4800.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 334239.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 334239.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 1320.000000

## INFILTRATION PROFILE

.500	.500	.500	.500	.500	.500	.500	.500
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.500	.500	.500	.500	.500	.500	.500	.500

A FACTOR IN INFILTRATION EQUATION (CINA) 1.126000

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 2760.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 266.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 976.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	588.0	1173.0	919.0	1298.0
WINDOW AREA SQFT (AWND)	142.0	142.0	42.0	179.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	14.2	14.2	4.2	17.9
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.321	.335	.303	.334
WALL TRANSFER FUNCTIONS				
CN FACTORS	.05164	.05390	.04875	.05374
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00022	.00023	.00021	.00023
N=2	.01343	.01402	.01268	.01397
N=3	.02959	.03088	.02793	.03079
N=4	.00819	.00855	.00773	.00852
N=5	.00022	.00023	.00021	.00023
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.16550	-1.16550	-1.16550	-1.16550
N=3	.35090	.35090	.35090	.35090
N=4	-.02450	-.02450	-.02450	-.02450
N=5	.00020	.00020	.00020	.00020
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	4800.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	1.580000E-01			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.314657E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.482E-03	.687E-02	.543E-02	.362E-03
			.120E+04	.120E+04
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.10	.189	-.180E-02
				999.
SKYLIGHT TILT DEGREES (TILT)				0.000000E+00
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)				9999.000000
SKYLIGHT HEIGHT FT (SKH)				0.000000E+00
SKYLIGHT WIDTH FT (SKW)				0.000000E+00
SKYLIGHT OVERHANG WIDTH FT (SKOW)				0.000000E+00
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)				0.000000E+00
SKYLIGHT GLASS NUMBER (NS)				1
SKYLIGHT SHADING COEFFICIENT (SHSK)				0.000000E+00
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1
SKY LIGHT AREA SQFT (ASKY)				0.000000E+00
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)				1.292998
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)				1.292998
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)				4.100000E-01
WEEKEND COOLING THERMOSTAT PROFILE				
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
.000	.000	.000	.000	.000
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0
55.0	55.0	55.0	55.0	55.0
55.0	55.0	55.0	55.0	55.0

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	BTU/HR				PEOPLE	
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING

PEAK VAL	4.	5844.	3375.	5625.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.200	.000	.000	55.0		.0
2	.100	.200	.000	.000	55.0		.0
3	.100	.200	.000	.000	55.0		.0
4	.100	.200	.000	.000	55.0		.0
5	.100	.200	.000	.000	55.0		.0
6	.100	.200	.000	.000	55.0		.0
7	1.000	.800	.800	.800	55.0		.0
8	1.000	.600	1.000	1.000	68.0		.0
9	1.000	.400	1.000	1.000	68.0		.0
10	1.000	.400	1.000	1.000	68.0		.0
11	1.000	.400	.800	.800	68.0		.0
12	1.000	.300	.600	.600	68.0		.0
13	1.000	.400	.800	.800	68.0		.0
14	1.000	.400	1.000	1.000	68.0		.0
15	1.000	.400	1.000	1.000	68.0		.0
16	1.000	.400	1.000	1.000	68.0		.0
17	.100	.200	.000	.000	55.0		.0
18	.100	.200	.000	.000	55.0		.0
19	.100	.200	.000	.000	55.0		.0
20	.100	.200	.000	.000	55.0		.0
21	.100	.200	.000	.000	55.0		.0
22	.100	.200	.000	.000	55.0		.0
23	.100	.200	.000	.000	55.0		.0
24	.100	.200	.000	.000	55.0		.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					0		
SUPPLY AIR CFM (SACFM)					4400.000000		
ECONOMIZER HIGH TEMP LIMIT F					68.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					6.000000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					334239.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					417800.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.210	.200	.300	.300	.500	.400	.510
.500	.590	.600	.680	.700	.770	.800	.840
.900	.910	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 672 - MOTOR POOL DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	8.	0.	0.	0.	0.	0.	0.	0.
	-102.	LOSS		-16.	-22.	0.	-17.	-5.	-58.	0.
FEB	.00	GAIN	9.58	.00	.01	.00	1.14	.00	.03	.00
	-77.24	LOSS		-12.42	-18.29	.00	-11.77	-3.93	-47.65	.00
MAR	.00	GAIN	11.92	.00	.02	.00	2.88	.01	.05	.00
	-59.57	LOSS		-10.54	-16.53	.00	-8.40	-3.54	-42.10	.00
APR	.00	GAIN	12.22	.00	.05	.00	5.08	.01	.10	.00
	-18.98	LOSS		-5.45	-9.44	.00	-2.83	-2.04	-23.05	.00
MAY	.00	GAIN	13.30	.01	.09	.00	6.31	.02	.17	.00
	-2.52	LOSS		-3.33	-7.28	.00	-.59	-1.52	-16.59	.00
JUN	.00	GAIN	13.31	.02	.07	.00	6.54	.02	.14	.00
	.00	LOSS		-2.63	-6.75	.00	-.16	-1.42	-15.50	.00
JUL	.00	GAIN	13.61	.02	.15	.00	6.47	.03	.30	.00
	.00	LOSS		-2.60	-6.96	.00	-.20	-1.48	-16.01	.00
AUG	.00	GAIN	12.06	.01	.09	.00	5.56	.02	.17	.00
	-.03	LOSS		-2.72	-6.34	.00	-.21	-1.33	-14.28	.00
SEP	.00	GAIN	10.60	.00	.13	.00	4.60	.03	.27	.00
	-2.87	LOSS		-3.55	-5.73	.00	-.68	-1.22	-13.51	.00
OCT	.00	GAIN	9.06	.00	.08	.00	2.98	.02	.16	.00
	-16.60	LOSS		-5.93	-7.66	.00	-2.90	-1.61	-17.71	.00
NOV	.00	GAIN	7.38	.00	.06	.00	1.30	.01	.11	.00
	-45.22	LOSS		-9.14	-12.13	.00	-7.65	-2.55	-29.24	.00
DEC	.00	GAIN	6.86	.00	.02	.00	.55	.01	.06	.00
	-99.47	LOSS		-15.40	-21.45	.00	-17.25	-4.53	-54.76	.00
TOT	0.	GAIN	128.	0.	1.	0.	44.	0.	2.	0.
	-425.	LOSS		-89.	-141.	0.	-70.	-30.	-348.	0.

MAX HEATING LOAD= -334239. BTUH ON DEC 18 HOUR 11 AMBIENT TEMP 11.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 3341.2

BEACON Energy Analysis By Energy Systems Engineers, Inc.

672-1.I

BLDG 672 - MOTOR POOL DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	58.	78.	54.	5 27	15 6	64. 4.	1.11	2.39	1.43	6.91
FEB	59.	79.	54.	13 2	15 6	65. 14.	.97	2.08	1.29	6.05
MAR	61.	95.	54.	12 4	14 6	73. 15.	1.06	2.29	1.43	6.67
APR	66.	106.	55.	24 9	13 6	80. 30.	1.02	2.18	1.38	6.38
MAY	73.	105.	55.	29 11	13 4	85. 38.	1.11	2.39	1.43	6.91
JUN	80.	110.	55.	29 17	14 3	88. 55.	1.02	2.18	1.38	6.38
JUL	85.	117.	57.	6 10	14 4	92. 57.	1.06	2.29	1.43	6.67
AUG	83.	111.	55.	29 25	14 6	96. 51.	1.11	2.39	1.43	6.91
SEP	74.	115.	55.	24 15	15 6	85. 39.	.97	2.08	1.38	6.15
OCT	65.	99.	55.	4 28	12 5	83. 31.	1.11	2.39	1.43	6.91
NOV	61.	93.	54.	8 3	13 7	77. 18.	1.06	2.29	1.38	6.62
DEC	58.	83.	47.	23 18	13 4	71. 1.	1.02	2.18	1.43	6.43
YEAR							12.62	27.16	16.85	78.99

BLDG 672 - MOTOR POOL DDC (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	708	0	0	0	-.3339E+06	.0000
FEB	619	0	0	0	-.3123E+06	.0000
MAR	586	0	0	0	-.2646E+06	.0000
APR	334	0	0	0	-.1768E+06	.0000
MAY	93	0	0	0	-.8784E+05	.0000
JUN	2	0	0	0	-313.7	.0000
JUL	0	0	0	0	.0000	.0000
AUG	4	0	0	0	-.1554E+05	.0000
SEP	119	0	0	0	-.8309E+05	.0000
OCT	363	0	0	0	-.1360E+06	.0000
NOV	507	0	0	0	-.2294E+06	.0000
DEC	706	0	13	0	-.3342E+06	.0000
YEAR	4041	0	13	0	-.3342E+06	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL	INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	160.13	.00	1.11	2.39	.42	6.91	4.8	
FEB	126.43	.00	.97	2.08	.38	6.05	4.8	
MAR	105.14	.00	1.06	2.29	.42	6.67	4.8	
APR	43.82	.00	1.02	2.18	.41	6.38	4.8	
MAY	9.13	.00	1.11	2.39	.42	6.91	4.8	
JUN	.09	.00	1.02	2.18	.41	6.38	4.8	
JUL	.00	.00	1.06	2.29	.42	6.67	4.8	
AUG	.35	.00	1.11	2.39	.42	6.91	4.8	
SEP	11.07	.00	.97	2.08	.41	6.15	4.8	
OCT	42.12	.00	1.11	2.39	.42	6.91	4.8	
NOV	85.63	.00	1.06	2.29	.41	6.62	4.8	
DEC	156.15	.00	1.02	2.18	.42	6.43	4.8	
YEAR	740.07	.00	12.62	27.16	4.94	78.99	4.8	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 172322. BTU/(SQFT-YEAR)

BLDG 672 - MOTOR POOL DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET	COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.3339E+06
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.0000	-.3123E+06
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.0000	-.2646E+06
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.1768E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.8784E+05
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-313.7
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	-.1554E+05
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.8309E+05
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.1360E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.2294E+06
DEC	883.	604.	1.000	35.	0.	0.	0	13	.0000	-.3342E+06

**COMPUTER SIMULATIONS**

BUILDING 730



**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 730  
BLDG. TYPE: BARRACKS

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	2797.5	2601.8				
COOLING (kWH)						

SUPPLY AIR FAN	0 CFM
FLOOR AREA	40986 FT <sup>2</sup>
CFM1	3167 CFM
UA	9330 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOURLY SAVE (HEATING ONLY) 4368 - 4368 = 0 HR/YR  
HOURLY SAVE (COOLING ONLY) 2928 - 2928 = 0 HR/YR

HOAUHC	2797.5 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	3167 CFM *	0 HR/YR		
HOAUH	2797.5 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	3167 CFM *	0 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	3167 CFM *	0 HR/YR		
COAUC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	3167 CFM *	0 HR/YR		
HOAOHC	2797.5 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	3167 CFM *	8760 HR/YR		
HOAOH	2797.5 MBtu -	0 MBtu	=	0.00E+00 Btu/CFM-HR
	3167 CFM *	4368 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	3167 CFM *	8760 HR/YR		
COAOCC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	3167 CFM *	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)

CALCULATED BY: BHS

CHECKED BY: AJN

DATE: 04-Mar-93

BUILDING NO.: 730

BLDG. TYPE: BARRACKS

**ENERGY CONSTANT CALCULATIONS**

ECC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	2928 HR/YR		
ECHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	8760 HR/YR		
NSUCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	0 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	0 HR/YR		
DDCCHC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	8760 HR/YR		
DDCCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	0 CFM *	2928 HR/YR		
NSC	2797.5 MBtu -	2601.8 MBtu	=	2.10E+04 Btu/UA
	9330 UA			
DSC	2601.8 MBtu -	0 MBtu	=	2.79E+05 Btu/UA
	9330 UA			
OPT	( 2 HR/DAY X 272 DAY/YR ) -		294 HR/YR	
			=	0 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			
			=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 09-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 730BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 730 BLDG NAME: BARRACKS (WITHOUT A/C)

BLDG FUNCTION:

FLOOR AREA: (SQ. FT)

40,986

# FLOORS 3

SLAB PERIMETER: (FT)

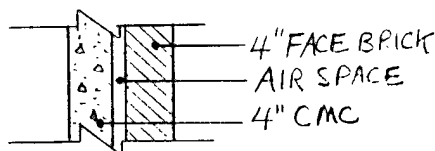
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## I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	9,088	9,088	1,845	1,845	21,866
GLASS	(SQ. FT)	467	435	17	19	938
PERSONNEL DOOR	(SQ. FT)	80	40	0	0	120
INSULATED PANEL	(SQ. FT)	233	217	9	9	468
WALLS, NET	(SQ. FT)	8,308	8,396	1,819	1,817	20,341
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					13,662
INSULATED PANEL	(SQ. FT)	468				
PERSONNEL DOOR	(SQ. FT)					120
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

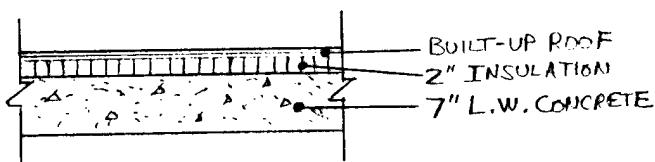
## II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 4" CMU / 9" L.W. CONC.	3.00
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.19
U=1/R	0.193

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" INSULATION	6.68
4. 7" L.W. CONCRETE	6.25
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.12
U=1/R	0.071

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

## III. INFILTRATION:

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.042	=	0
AVG. WALL H/M/L (SQ.FT.)	H	21866	X CFM / SQ.FT.	0.138	= 3,018
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	50	X CFM / OPENING /HR	1.600	=	80
DOOR OPENINGS / HR - DOUBLE DOORS	50	X CFM / OPENING /HR	1.385	=	69
		TOTAL INFILTRATION (CFM)		=	3167

UA PANEL	= PANEL AREA	468	X PANEL 'U'	0.238	=	111
UA PDOOR	= PDOOR AREA	120	X DOOR 'U'	0.391	=	47
UA WALL	= WALL AREA	19,873	X WALL 'U'	0.193	=	3,917
UA ROOF	= ROOF AREA	13,662	X ROOF 'U'	0.071	=	968
UA GLASS	= GLASS AREA	938	X GLASS 'U'	0.621	=	582
UA SLAB	= SLAB PERIM.	514	X SLF	0.830	=	427
UA BASEM.	= B-WALL AREA	0	X BASE 'U'	0.000	=	0
INFILTRATION	= CFM	3167	X A. T. F.	1.035	=	3,278
			TOTAL UA (BTU/HR°F)			9,330

EMC NO.: 3204-000  
DATE: 27-Mar-93  
PREPARED BY: CEL  
CHECKED BY: 730ZN1  
FILE: 730  
BLDG:

Rates of Heat Gain from Occupants of Conditioned Spaces								
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
1	374	1	Seated at rest	Theater, Movie	225	105	84,150	39,270
<b>TOTAL</b>	<b>374</b>					<b>TOTAL</b>	<b>84,150</b>	<b>39,270</b>

<b>Peak Wattage Value for Lights</b>					
<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
1	18	5	Fluorescent, 1 – 34w lamp, 16w ballast (1x4 ft. fixture)	50	900
	76	6	Fluorescent, 2 – 34w lamps, 16w ballast (2x4 ft. fixture)	84	6,384
	64	8	Fluorescent, 4 – 34w lamps, 2 – 16w ballasts (2x4 ft. fix.)	168	10,752
	102	18	Incandescent – 60w	60	6,120
TOTAL	260			<b>TOTAL</b>	24,156

[illegible]

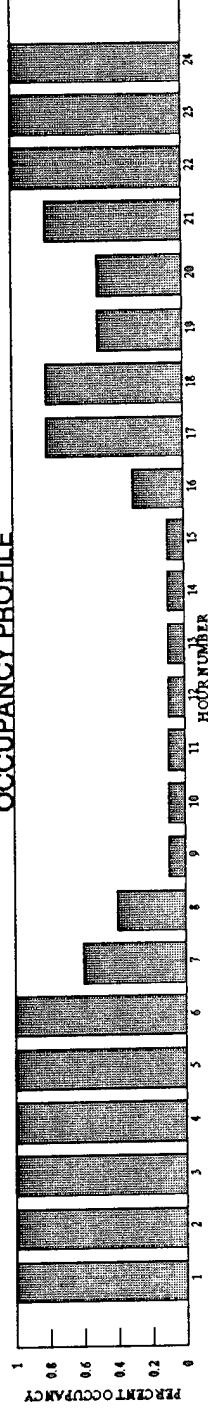
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

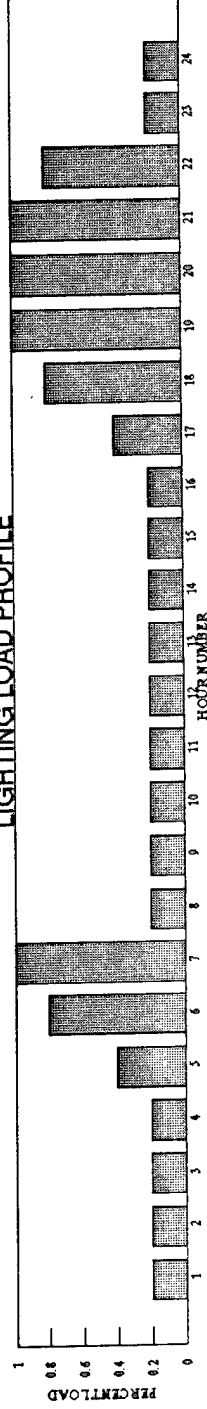
EMC NO.: 3204-000  
 DATE: 27-Mar-93  
 PREPARED BY: CEL  
 CHECKED BY: 730ZN1  
 FILE: 730  
 BLDG: 730  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Barracks	OCCUPANCY	1	1	1	1	1	1	0.6	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.8	0.8	0.5	0.5	0.8	1	1	1
		LIGHTING	0.2	0.2	0.2	0.2	0.4	0.8	1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.8	1	1	1	0.8	0.2	0.2
		PROCESS																	0.3	0.3	0.3	0.3	0.3			

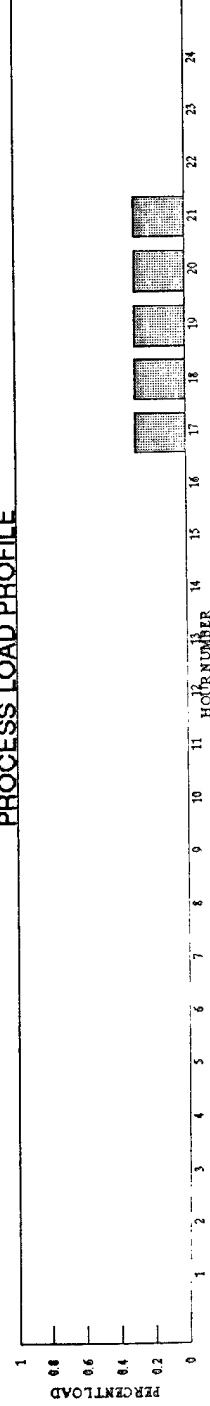
**OCCUPANCY PROFILE**



**LIGHTING LOAD PROFILE**



**PROCESS LOAD PROFILE**



BLDG 730 - BARRACKS WITHOUT A/C BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 0.000000E+00

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 437184.000000

FLOOR AREA (SQFT) 40986.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1664120.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 409860.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 3167.000000

## INFILTRATION PROFILE

.670	.670	.670	.670	.670	.670	.670	.670
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.670	.670	.670	.670	.670	.670

A FACTOR IN INFILTRATION EQUATION (CINA) 4.350000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 231200.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 0.000000E+00

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 47.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUDO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUDN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	8613.0	1828.0	8541.0	1826.0
WINDOW AREA SQFT (AWND)	435.0	18.5	467.0	17.2
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	43.5	1.9	46.7	1.7
WIDTH OF OVERHANG (WOH)	2.5	2.5	2.5	2.5
OVERHANG HGT ABV WNDW(HOH)	1.0	1.0	1.0	1.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)			0.000000E+00	
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)			9999.000000	
SKYLIGHT HEIGHT FT (SKH)			0.000000E+00	
SKYLIGHT WIDTH FT (SKW)			0.000000E+00	
SKYLIGHT OVERHANG WIDTH FT (SKOW)			0.000000E+00	
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)			0.000000E+00	
SKYLIGHT GLASS NUMBER (NS)			1	
SKYLIGHT SHADING COEFFICIENT (SHSK)			0.000000E+00	
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)			0.000000E+00	
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	KW	BTU/HR				HEATING	COOLING
			LIGHTS	PROCESS	PEOPLE SENSIBLE	PEOPLE LATENT		
			24.	47268.	84150.	39270.		
			HOURLY FRACTION OF PEAK					
	1	.200	.000	1.000	1.000	1.000	72.0	.0
	2	.200	.000	1.000	1.000	1.000	72.0	.0
	3	.200	.000	1.000	1.000	1.000	72.0	.0
	4	.200	.000	1.000	1.000	1.000	72.0	.0
	5	.400	.000	1.000	1.000	1.000	72.0	.0
	6	.800	.000	1.000	1.000	1.000	72.0	.0
	7	1.000	.000	.600	.600	.600	72.0	.0
	8	.200	.000	.400	.400	.400	72.0	.0
	9	.200	.000	.100	.100	.100	72.0	.0
	10	.200	.000	.100	.100	.100	72.0	.0
	11	.200	.000	.100	.100	.100	72.0	.0
	12	.200	.000	.100	.100	.100	72.0	.0

13	.200	.000	.100	.100	72.0	.0
14	.200	.000	.100	.100	72.0	.0
15	.200	.000	.100	.100	72.0	.0
16	.200	.000	.300	.300	72.0	.0
17	.400	.300	.800	.800	72.0	.0
18	.800	.300	.800	.800	72.0	.0
19	1.000	.300	.500	.500	72.0	.0
20	1.000	.300	.500	.500	72.0	.0
21	1.000	.300	.800	.800	72.0	.0
22	.800	.000	1.000	1.000	72.0	.0
23	.200	.000	1.000	1.000	72.0	.0
24	.200	.000	1.000	1.000	72.0	.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					0.000000E+00	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					0.000000E+00	
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					0.000000E+00	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					1.000000E-05	
FAN TOTAL PRESSURE IN. WATER (DP)					0.000000E+00	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1700000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					2125000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10	
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
10.0	16.0	20.0	22.0	30.0	28.5	40.0 34.5
50.0	42.5	60.0	50.0	70.0	60.0	80.0 71.5
90.0	85.0	100.	100.			



BLDG 730 - BARRACKS WITHOUT A/C BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -381.	GAIN LOSS	13. 13.	0. -28.	0. -1.	0. 0.	0. -90.	0. -14.	0. -326.	0. 0.
FEB	0. -307.	GAIN LOSS	16. 16.	0. -25.	0. -1.	0. 0.	0. -69.	0. -12.	0. -276.	0. 0.
MAR	0. -245.	GAIN LOSS	20. 20.	0. -22.	0. -1.	0. 0.	4. -56.	0. -11.	0. -245.	0. 0.
APR	0. -96.	GAIN LOSS	20. 20.	0. -14.	0. -1.	0. 0.	10. -30.	0. -7.	1. -139.	0. 0.
MAY	.00 -12.99	GAIN LOSS	22.17 22.17	.00 -8.26	.00 -.47	.00 .00	14.87 -17.38	.05 -4.75	.77 -84.96	.00 .00
JUN	.00 .00	GAIN LOSS	22.84 22.84	.00 -7.05	.00 -.42	.00 .00	15.78 -14.56	.02 -4.32	.26 -74.92	.00 .00
JUL	.00 .00	GAIN LOSS	23.13 23.13	.00 -7.05	.01 -.43	.00 .00	16.24 -15.29	.06 -4.43	1.00 -78.56	.00 .00
AUG	.00 .00	GAIN LOSS	19.94 19.94	.00 -7.32	.01 -.43	.00 .00	13.90 -15.87	.08 -4.33	1.43 -74.79	.00 .00
SEP	.00 -16.25	GAIN LOSS	16.90 16.90	.00 -8.76	.01 -.43	.00 .00	11.72 -17.99	.09 -4.45	1.69 -82.58	.00 .00
OCT	0. -85.	GAIN LOSS	15. 15.	0. -14.	0. -1.	0. 0.	6. -32.	0. -6.	1. -120.	0. 0.
NOV	0. -186.	GAIN LOSS	12. 12.	0. -19.	0. -1.	0. 0.	2. -52.	0. -9.	0. -183.	0. 0.
DEC	0. -367.	GAIN LOSS	12. 12.	0. -30.	0. -1.	0. 0.	0. -91.	0. -13.	0. -310.	0. 0.
TOT	0. -1696.	GAIN LOSS	215. 215.	0. -189.	0. -9.	0. 0.	94. -500.	0. -93.	8. -1996.	0. 0.

MAX HEATING LOAD= -1221352. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F

5633.3

BLDG 730 - BARRACKS WITHOUT A/C BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	72.	72.	71.	4 1	18 1	61. 42.	7.64	5.11	.00	65.84
FEB	72.	73.	71.	9 2	22 9	64. 16.	6.90	4.62	.00	59.46
MAR	72.	78.	71.	28 3	21 9	63. 17.	7.64	5.11	.00	65.84
APR	74.	84.	72.	30 9	22 9	67. 34.	7.39	4.95	.00	63.71
MAY	79.	90.	72.	29 11	22 4	68. 38.	7.64	5.11	.00	65.84
JUN	85.	95.	77.	29 17	22 10	75. 72.	7.39	4.95	.00	63.71
JUL	89.	98.	77.	15 24	22 10	83. 70.	7.64	5.11	.00	65.84
AUG	88.	95.	76.	29 26	21 8	76. 66.	7.64	5.11	.00	65.84
SEP	81.	94.	72.	2 18	22 9	79. 66.	7.39	4.95	.00	63.71
OCT	74.	86.	72.	4 13	22 12	69. 68.	7.64	5.11	.00	65.84
NOV	72.	79.	71.	8 14	22 16	67. 67.	7.39	4.95	.00	63.71
DEC	72.	72.	71.	23 18	21 9	52. 3.	7.64	5.11	.00	65.84
YEAR							89.95	60.18	.00	775.16

BLDG 730 - BARRACKS WITHOUT A/C BASERUN (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED			NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER		HEATING	COOLING	HEATING	COOLING
JAN	740	0		0	0	-.1112E+07	.0000
FEB	659	0		0	0	-.1013E+07	.0000
MAR	639	0		0	0	-.1056E+07	.0000
APR	363	0		0	0	-.5931E+06	.0000
MAY	97	0		0	0	-.3199E+06	.0000
JUN	0	0		0	0	.0000	.0000
JUL	0	0		0	0	.0000	.0000
AUG	0	0		0	0	.0000	.0000
SEP	117	0		0	0	-.2777E+06	.0000
OCT	408	0		0	0	-.4730E+06	.0000
NOV	591	0		0	0	-.7336E+06	.0000
DEC	740	0		0	0	-.1221E+07	.0000
YEAR	4354	0		0	0	-.1221E+07	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL	INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT	GAIN MILLION BTU	
JAN	585.68	.00	7.64	5.11	.00	65.84	24.2	
FEB	486.06	.00	6.90	4.62	.00	59.46	24.2	
MAR	418.71	.00	7.64	5.11	.00	65.84	24.2	
APR	193.69	.00	7.39	4.95	.00	63.71	24.2	
MAY	41.52	.00	7.64	5.11	.00	65.84	24.2	
JUN	.00	.00	7.39	4.95	.00	63.71	24.2	
JUL	.00	.00	7.64	5.11	.00	65.84	24.2	
AUG	.00	.00	7.64	5.11	.00	65.84	24.2	
SEP	49.64	.00	7.39	4.95	.00	63.71	24.2	
OCT	194.11	.00	7.64	5.11	.00	65.84	24.2	
NOV	349.25	.00	7.39	4.95	.00	63.71	24.2	
DEC	569.97	.00	7.64	5.11	.00	65.84	24.2	
YEAR	2888.63	.00	89.95	60.18	.00	775.16	24.2	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 79437. BTU/(SQFT-YEAR)

BLDG 730 - BARRACKS WITHOUT A/C      BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1112E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.1013E+07
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.1056E+07
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5931E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.3199E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2777E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4730E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.7336E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1221E+07

BLDG 730 - BARRACKS WITHOUT A/C DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 0.000000E+00

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 437184.000000

FLOOR AREA (SQFT) 40986.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1664120.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 409860.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 3167.000000

## INFILTRATION PROFILE

.670	.670	.670	.670	.670	.670	.670	.670
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	.670	.670	.670	.670	.670	.670

A FACTOR IN INFILTRATION EQUATION (CINA) 4.350000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 231200.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 0.000000E+00

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 47.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	8613.0	1828.0	8541.0	1826.0
WINDOW AREA SQFT (AWND)	435.0	18.5	467.0	17.2
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	43.5	1.9	46.7	1.7
WIDTH OF OVERHANG (WOH)	2.5	2.5	2.5	2.5
OVERHANG HGT ABV WNDW (HOH)	1.0	1.0	1.0	1.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.194	.193	.194	.194
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01454	.01447	.01454	.01454
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00002	.00002	.00002	.00002
N=2	.00224	.00223	.00224	.00224
N=3	.00805	.00801	.00805	.00805
N=4	.00394	.00392	.00394	.00394
N=5	.00029	.00029	.00029	.00029
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	13662.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	1.177955E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.000	.121E-03	.613E-03	.403E-03	.403E-04 806.
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00	-1.46	.533	-.611E-01	.820E-03 999.
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)			1.292998	
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)			1.292998	
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)			4.300000E-01	

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	BTU/HR		HEATING	COOLING
				PEOPLE SENSIBLE	PEOPLE LATENT		
		24.	47268.	84150.	39270.		
		HOURLY FRACTION OF PEAK					
1		.200	.000	1.000	1.000	70.0	.0
2		.200	.000	1.000	1.000	70.0	.0
3		.200	.000	1.000	1.000	70.0	.0
4		.200	.000	1.000	1.000	70.0	.0
5		.400	.000	1.000	1.000	70.0	.0
6		.800	.000	1.000	1.000	70.0	.0
7		1.000	.000	.600	.600	70.0	.0
8		.200	.000	.400	.400	70.0	.0
9		.200	.000	.100	.100	70.0	.0
10		.200	.000	.100	.100	70.0	.0
11		.200	.000	.100	.100	70.0	.0
12		.200	.000	.100	.100	70.0	.0

13	.200	.000	.100	.100	70.0	.0
14	.200	.000	.100	.100	70.0	.0
15	.200	.000	.100	.100	70.0	.0
16	.200	.000	.300	.300	70.0	.0
17	.400	.300	.800	.800	70.0	.0
18	.800	.300	.800	.800	70.0	.0
19	1.000	.300	.500	.500	70.0	.0
20	1.000	.300	.500	.500	70.0	.0
21	1.000	.300	.800	.800	70.0	.0
22	.800	.000	1.000	1.000	70.0	.0
23	.200	.000	1.000	1.000	70.0	.0
24	.200	.000	1.000	1.000	70.0	.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					65.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					0.000000E+00	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					0.000000E+00	
ECONOMIZER HIGH TEMP LIMIT F					0.000000E+00	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					0.000000E+00	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					1.000000E-05	
FAN TOTAL PRESSURE IN. WATER (DP)					0.000000E+00	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1700000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					2125000.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10	
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
10.0	16.0	20.0	22.0	30.0	28.5	40.0 34.5
50.0	42.5	60.0	50.0	70.0	60.0	80.0 71.5
90.0	85.0	100.	100.			



BLDG 730 - BARRACKS WITHOUT A/C DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -352.	GAIN LOSS	13.	0. -27.	0. -1.	0. 0.	0. -84.	0. -13.	0. -305.	0. 0.
FEB	0. -281.	GAIN LOSS	16.	0. -24.	0. -1.	0. 0.	0. -63.	0. -11.	0. -258.	0. 0.
MAR	0. -219.	GAIN LOSS	20.	0. -20.	0. -1.	0. 0.	4. -51.	0. -10.	0. -228.	0. 0.
APR	0. -81.	GAIN LOSS	20.	0. -13.	0. -1.	0. 0.	11. -27.	0. -6.	2. -128.	0. 0.
MAY	.00 -8.69	GAIN LOSS	22.17	.00 -7.97	.00 -.45	.00 .00	15.34 -16.71	.05 -4.62	.86 -82.31	.00 .00
JUN	.00 .00	GAIN LOSS	22.84	.00 -7.05	.00 -.42	.00 .00	15.78 -14.56	.02 -4.32	.26 -74.92	.00 .00
JUL	.00 .00	GAIN LOSS	23.13	.00 -7.05	.01 -.43	.00 .00	16.24 -15.29	.06 -4.43	1.00 -78.56	.00 .00
AUG	.00 .00	GAIN LOSS	19.94	.00 -7.32	.01 -.43	.00 .00	13.90 -15.87	.08 -4.33	1.43 -74.79	.00 .00
SEP	.00 -9.97	GAIN LOSS	16.90	.00 -8.42	.01 -.41	.00 .00	12.34 -17.11	.11 -4.29	2.10 -79.19	.00 .00
OCT	0. -69.	GAIN LOSS	15.	0. -13.	0. -1.	0. 0.	6. -29.	0. -6.	2. -110.	0. 0.
NOV	0. -164.	GAIN LOSS	12.	0. -18.	0. -1.	0. 0.	2. -48.	0. -8.	0. -168.	0. 0.
DEC	0. -339.	GAIN LOSS	12.	0. -28.	0. -1.	0. 0.	0. -85.	0. -13.	0. -291.	0. 0.
TOT	0. -1524.	GAIN LOSS	215.	0. -180.	0. -9.	0. 0.	98. -466.	1. -89.	10. -1878.	0. 0.

MAX HEATING LOAD= -1174096. BTUH ON DEC 18 HOUR 9 AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24 AMBIENT TEMP 42.

ZONE UA BTU/HR-F 5633.3

BEACON Energy Analysis By Energy Systems Engineers, Inc.

730-1.I

BLDG 730 - BARRACKS WITHOUT A/C DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	71.	69.	4 29	21 8	57. 18.	7.64	5.11	.00	65.84
FEB	70.	71.	69.	9 2	22 9	64. 16.	6.90	4.62	.00	59.46
MAR	70.	77.	70.	28 3	21 9	63. 17.	7.64	5.11	.00	65.84
APR	73.	84.	70.	30 9	22 9	67. 34.	7.39	4.95	.00	63.71
MAY	78.	90.	70.	29 9	22 4	68. 44.	7.64	5.11	.00	65.84
JUN	85.	95.	77.	29 17	22 10	75. 72.	7.39	4.95	.00	63.71
JUL	89.	98.	77.	15 24	22 10	83. 70.	7.64	5.11	.00	65.84
AUG	88.	95.	76.	29 26	21 8	76. 66.	7.64	5.11	.00	65.84
SEP	80.	94.	70.	2 14	22 8	79. 49.	7.39	4.95	.00	63.71
OCT	73.	86.	70.	4 11	22 9	69. 43.	7.64	5.11	.00	65.84
NOV	70.	78.	70.	8 3	22 8	67. 22.	7.39	4.95	.00	63.71
DEC	70.	70.	69.	23 18	21 9	52. 3.	7.64	5.11	.00	65.84
YEAR							89.95	60.18	.00	775.16

BLDG 730 - BARRACKS WITHOUT A/C DDC (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	733	0	0	0	-.1063E+07	.0000
FEB	653	0	0	0	-.9637E+06	.0000
MAR	617	0	0	0	-.1005E+07	.0000
APR	328	0	0	0	-.5527E+06	.0000
MAY	71	0	0	0	-.2870E+06	.0000
JUN	0	0	0	0	.0000	.0000
JUL	0	0	0	0	.0000	.0000
AUG	0	0	0	0	.0000	.0000
SEP	74	0	0	0	-.2466E+06	.0000
OCT	373	0	0	0	-.4365E+06	.0000
NOV	559	0	0	0	-.6909E+06	.0000
DEC	739	0	0	0	-.1174E+07	.0000
YEAR	4147	0	0	0	-.1174E+07	.0000

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	554.38	.00	7.64	5.11	.00	65.84	24.2
FEB	458.88	.00	6.90	4.62	.00	59.46	24.2
MAR	387.87	.00	7.64	5.11	.00	65.84	24.2
APR	169.04	.00	7.39	4.95	.00	63.71	24.2
MAY	30.00	.00	7.64	5.11	.00	65.84	24.2
JUN	.00	.00	7.39	4.95	.00	63.71	24.2
JUL	.00	.00	7.64	5.11	.00	65.84	24.2
AUG	.00	.00	7.64	5.11	.00	65.84	24.2
SEP	30.86	.00	7.39	4.95	.00	63.71	24.2
OCT	171.04	.00	7.64	5.11	.00	65.84	24.2
NOV	319.64	.00	7.39	4.95	.00	63.71	24.2
DEC	540.93	.00	7.64	5.11	.00	65.84	24.2
YEAR	2662.64	.00	89.95	60.18	.00	775.16	24.2

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 73923. BTU/(SQFT-YEAR)

BLDG 730 - BARRACKS WITHOUT A/C DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT - DEG. F	HOURS SYSTEM COOL	WHEN LOADS NOT MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.1063E+07
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.9637E+06
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.0000	-.1005E+07
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.0000	-.5527E+06
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.0000	-.2870E+06
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.0000	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.0000	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.0000	-.2466E+06
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.0000	-.4365E+06
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.0000	-.6909E+06
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.1174E+07

**COMPUTER SIMULATIONS**

**BUILDING 826**

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 826  
BLDG. TYPE: GYMNASIUM

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	3504.6	3172.0	3012.7		3352.1	3438.5
COOLING (kWH)						

SUPPLY AIR FAN	26500 CFM
FLOOR AREA	19827 FT²
CFM1	2146 CFM
UA	8806 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	500	2000	75 HR	HR. ON HEATING	2210 HR/YR
SAT.	1200	1700	5 HR	HR. ON COOLING	1481 HR/YR
SUN.	1200	1700	5 HR	HR. OFF HEATING	2158 HR/YR
	TOTAL OCCUPY HR.		85 HR/WK	HR. OFF COOLING	1447 HR/YR
	TOTAL UNOCC. HR.		83 HR/WK		
	ANNUAL OCCUPY HR.		4432 HR/YR		
	ANNUAL UNOCC. HR.		4328 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 2210 = 2158 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 1481 = 1447 HR/YR

HOAUHC	3504.6 MBtu -	3352.1 MBtu	=	1.64E+01 Btu/CFM-HR
	2146 CFM *	4328 HR/YR		
HOAUH	3504.6 MBtu -	3352.1 MBtu	=	3.29E+01 Btu/CFM-HR
	2146 CFM *	2158 HR/YR		
COAUHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2146 CFM *	4328 HR/YR		
COAUH	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2146 CFM *	1447 HR/YR		
HOAOHC	3504.6 MBtu -	3438.5 MBtu	=	6.95E+00 Btu/CFM-HR
	2146 CFM *	4432 HR/YR		
HOAOH	3504.6 MBtu -	3438.5 MBtu	=	1.39E+01 Btu/CFM-HR
	2146 CFM *	2210 HR/YR		
COAOHC	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2146 CFM *	4432 HR/YR		
COAOH	0 kWH -	0 kWH	=	0.00E+00 kWH/CFM-HR
	2146 CFM *	1481 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 826  
BLDG. TYPE: GYMNASIUM

**ENERGY CONSTANT CALCULATIONS**

ECO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	26500 CFM *	1481 HR/YR		
ECHO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	26500 CFM *	4432 HR/YR		
NSUCHO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	26500 CFM *	4328 HR/YR		
NSUCC	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	26500 CFM *	1447 HR/YR		
DDCCHO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	26500 CFM *	4432 HR/YR		
DDCCO	0 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	26500 CFM *	1481 HR/YR		
NSC	3504.6 MBtu -	3172 MBtu	=	3.78E+04 Btu/UA
	8806 UA			
DSC	3172 MBtu -	3012.69 MBtu	=	1.81E+04 Btu/UA
	8806 UA			
OPT	( 2 HR/DAY X 272 DAY/YR ) -		294 HR/YR	
			=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			
			=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR



**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: BHS

JOB: 3204.000

CHK:

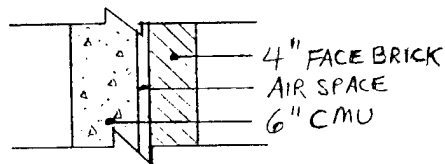
FILE: 826BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

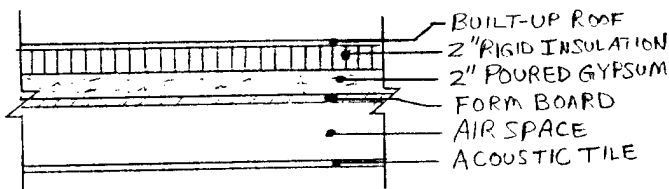
BLDG NO: 826 BLDG NAME: GYMNASIUM  
 BLDG FUNCTION: BASKETBALL, RACQUET BALL, WEIGHT LIFTING  
 FLOOR AREA: (SQ. FT) 19,827 # FLOORS 1  
 SLAB PERIMETER: (FT) 588

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	5,844	6,252	3,420	2,660	18,176
GLASS	(SQ. FT)	42	55	0	0	97
PERSONNEL DOOR	(SQ. FT)	84	168	42	0	294
INSULATED PANEL	(SQ. FT)	345	324	0	120	789
WALLS, NET	(SQ. FT)	5,373	5,705	3,378	2,540	16,996
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 19,827
INSULATED PANEL	(SQ. FT)	789	PERSONNEL DOOR	(SQ. FT)		294
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CONCRETE BLK	1.89
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	4.08
U=1/R	0.245

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. 2" POURED GYPSUM	1.80
5. FORM BOARD	1.19
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	12.64
U=1/R	0.079

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	18176	X CFM / SQ.FT.	0.115	= 2,090
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	40		X CFM / OPENING / HR	1.385	= 55
TOTAL INFILTRATION (CFM)				=	2146

UA PANEL	= PANEL AREA	789	X PANEL 'U'	0.238	=	188
UA PDOOR	= PDOOR AREA	294	X DOOR 'U'	0.391	=	115
UA WALL	= WALL AREA	16,996	X WALL 'U'	0.245	=	4,166
UA ROOF	= ROOF AREA	19,827	X ROOF 'U'	0.079	=	1,568
UA GLASS	= GLASS AREA	97	X GLASS 'U'	0.621	=	60
UA SLAB	= SLAB PERIM.	588	X SLF	0.830	=	488
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	2146	X A. T. F.	1.035	=	2,221
TOTAL UA (BTU/HR°F)						8,806

3204-000

06-Feb-93

BHS

**CEL**

826Z1

826

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat. (BTU/H)
1	5	4	Seated, light work, typing	Offices, hotels, apts	250	200	1,000
	60	11	Heavy work, athletics	Gymnasium	710	1,090	42,600
TOTAL	65					TOTAL	43,850
							66,400

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	40	35	Merc. Vap. — Medium Base, 75w with 18w ballast	93	3,720
	10	18	Incandescent — 60w	60	600
	34	16	Fluorescent, 2 — 15w lamps, 5w ballast	35	1,190
	10	10	Fluorescent, 2 — 34w lamps, 4w ballast (2x4 ft. fixture)	72	720
	35	47	HPS — Medium Base, 35w with 11w ballast	46	1,610
	3	38	Merc. Vap. — Mogul Base, 175w with 25w ballast	200	600
TOTAL	132			TOTAL	8,440

## Peak Value for Internal Gains

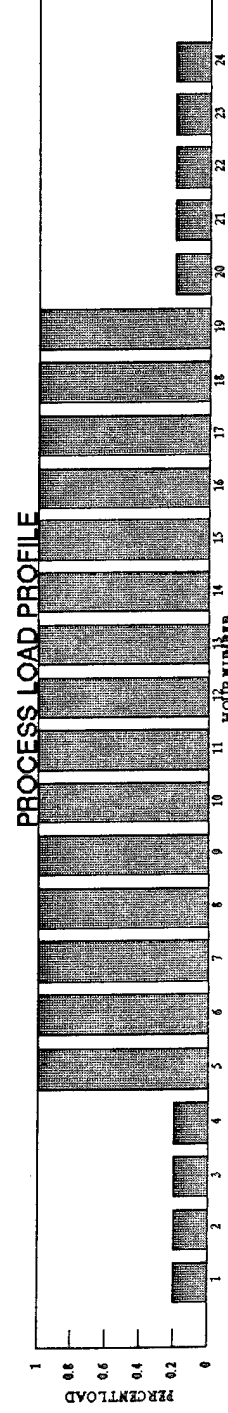
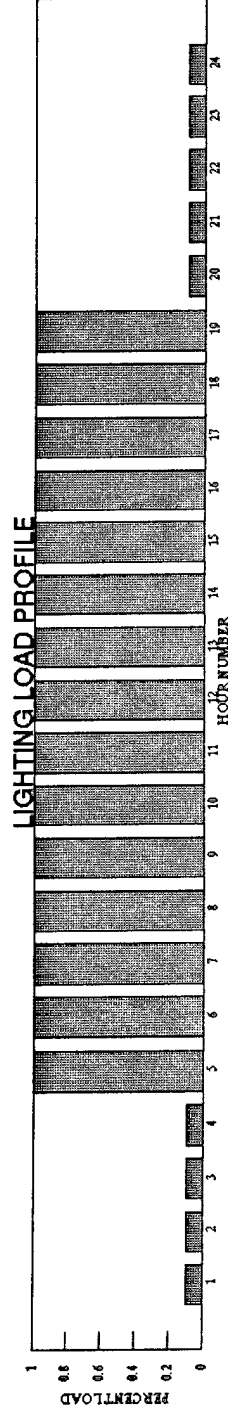
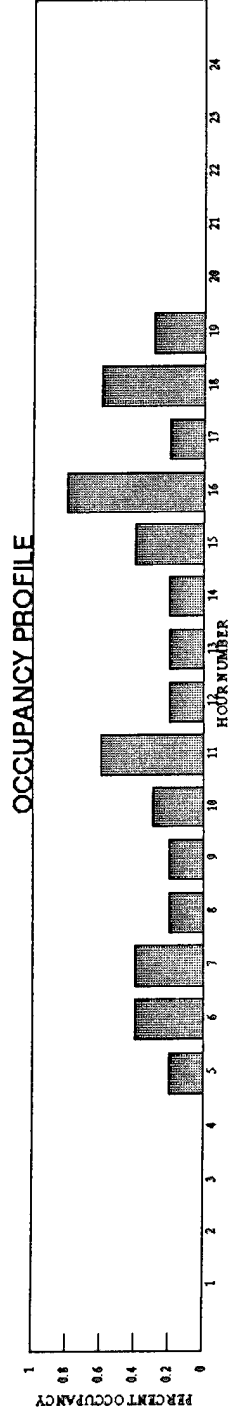
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
1	1	3	Microcomputer	350	91%	350	1,195
	1	24	Coffee Maker	1,500	30%	1,500	5,120
	1	49	Radio	71	10%	71	242
	2	70	Water Cooler	700	50%	1,400	4,778
				TOTAL	44%	3,321	11,335

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 06-Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 826Z1  
 BLDG: 826  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
6	Gym	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		PROCESS	0.2	0.2	0.2	0.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



BLDG 826 - GYMNASIUM BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 553768.100000

FLOOR AREA (SQFT) 19827.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1919350.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 1919350.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 2146.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.330000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 48600.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 488.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 115.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	6029.0	2660.0	5718.0	3378.0
WINDOW AREA SQFT (AWND)	55.0	.0	42.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	5.5	.0	4.2	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	19827.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.900000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	5.035165E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.868E-04 .217E-02 .252E-02 .260E-03	867.	867.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.16 .223 -.220E-02	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.400000E-01			

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
KW		BTU/HR				
		PEOPLE		PEOPLE		
		SENSIBLE	LATENT		HEATING	COOLING
PEAK VAL	LIGHTS	PROCESS	SENSIBLE	LATENT		
	8.	4987.	43850.	66400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.200	.000	.000	60.0	.0
2	.100	.200	.000	.000	60.0	.0
3	.100	.200	.000	.000	60.0	.0
4	.100	.200	.000	.000	60.0	.0
5	1.000	1.000	.200	.200	60.0	.0
6	1.000	1.000	.400	.400	60.0	.0
7	1.000	1.000	.400	.400	60.0	.0
8	1.000	1.000	.200	.200	60.0	.0
9	1.000	1.000	.200	.200	60.0	.0
10	1.000	1.000	.300	.300	60.0	.0
11	1.000	1.000	.600	.600	60.0	.0
12	1.000	1.000	.200	.200	60.0	.0

13	1.000	1.000	.200	.200	60.0	.0	
14	1.000	1.000	.200	.200	60.0	.0	
15	1.000	1.000	.400	.400	60.0	.0	
16	1.000	1.000	.800	.800	60.0	.0	
17	1.000	1.000	.200	.200	60.0	.0	
18	1.000	1.000	.600	.600	60.0	.0	
19	1.000	1.000	.300	.300	60.0	.0	
20	.100	.200	.000	.000	60.0	.0	
21	.100	.200	.000	.000	60.0	.0	
22	.100	.200	.000	.000	60.0	.0	
23	.100	.200	.000	.000	60.0	.0	
24	.100	.200	.000	.000	60.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					26500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					6.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					3.750000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1919350.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					2399188.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 826 - GYMNASIUM BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. GAIN -506. LOSS		2.	0. -34.	0. -11.	0. 0.	1. -60.	0. -1.	0. -433.	0. 0.
FEB	0. GAIN -407. LOSS		2.	0. -27.	0. -9.	0. 0.	3. -42.	0. -1.	1. -360.	0. 0.
MAR	0. GAIN -336. LOSS		2.	0. -22.	0. -8.	0. 0.	10. -30.	0. -1.	2. -319.	0. 0.
APR	0. GAIN -118. LOSS		2.	0. -11.	0. -4.	0. 0.	21. -11.	0. 0.	7. -149.	0. 0.
MAY	.00 GAIN -23.07 LOSS		2.36	1.01 -4.21	.29 -2.37	.00 .00	30.14 -2.74	.02 -.19	9.57 -84.41	.00 .00
JUN	.00 GAIN -.37 LOSS		2.41	1.45 -2.68	.28 -1.94	.00 .00	32.03 -1.14	.02 -.16	9.49 -66.10	.00 .00
JUL	.00 GAIN -.05 LOSS		2.43	1.64 -2.79	.31 -1.96	.00 .00	31.91 -1.20	.03 -.16	11.08 -69.48	.00 .00
AUG	.00 GAIN -.01 LOSS		2.11	1.23 -2.86	.34 -1.85	.00 .00	28.87 -1.26	.03 -.15	10.85 -65.63	.00 .00
SEP	.00 GAIN -22.84 LOSS		1.90	.25 -5.43	.32 -2.27	.00 .00	22.41 -3.15	.03 -.19	10.91 -74.87	.00 .00
OCT	0. GAIN -102. LOSS		2.	0. -12.	0. -4.	0. 0.	14. -11.	0. 0.	7. -127.	0. 0.
NOV	0. GAIN -241. LOSS		1.	0. -20.	0. -6.	0. 0.	6. -27.	0. -1.	3. -227.	0. 0.
DEC	0. GAIN -517. LOSS		1.	0. -34.	0. -11.	0. 0.	1. -60.	0. -1.	0. -443.	0. 0.
TOT	0. GAIN -2274. LOSS		23.	6. -176.	2. -65.	0. 0.	202. -251.	0. -5.	73. -2418.	0. 0.

MAX HEATING LOAD= -1919350. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F

6098.8

BLDG 826 - GYMNASIUM BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	66.	59.	4 29	16 4	63. 11.	4.16	5.90	5.39	29.25
FEB	60.	69.	59.	13 2	16 3	68. 15.	3.76	5.33	4.78	26.33
MAR	61.	80.	59.	28 12	16 1	76. 58.	4.16	5.90	4.86	28.73
APR	65.	88.	58.	30 1	16 6	84. 61.	4.03	5.71	4.53	27.63
MAY	70.	94.	59.	26 9	19 20	75. 54.	4.16	5.90	4.05	27.92
JUN	76.	96.	60.	30 19	19 5	82. 58.	4.03	5.71	3.65	26.74
JUL	81.	105.	60.	28 10	18 4	90. 57.	4.16	5.90	3.82	27.69
AUG	79.	100.	60.	29 25	16 6	95. 51.	4.16	5.90	4.02	27.88
SEP	73.	99.	59.	2 24	18 20	86. 56.	4.03	5.71	3.71	26.80
OCT	65.	88.	59.	1 3	15 2	85. 58.	4.16	5.90	4.52	28.39
NOV	62.	78.	59.	8 13	16 18	75. 55.	4.03	5.71	4.80	27.89
DEC	60.	68.	53.	23 18	17 4	62. 1.	4.16	5.90	5.20	29.06
YEAR							48.98	69.51	53.33	334.31



BLDG 826 - GYMNASIUM BASERUN (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	715	0	0	0	-.1897E+07	.0000
FEB	634	0	0	0	-.1654E+07	.0000
MAR	614	0	0	0	-.1423E+07	.0000
APR	376	0	0	0	-.9515E+06	.0000
MAY	135	0	0	0	-.6113E+06	.0000
JUN	7	0	0	0	-.1041E+06	.0000
JUL	2	0	0	0	-.3933E+05	.0000
AUG	3	0	0	0	-7478.	.0000
SEP	139	0	0	0	-.4159E+06	.0000
OCT	389	0	0	0	-.7568E+06	.0000
NOV	526	0	0	0	-.1272E+07	.0000
DEC	715	0	12	0	-.1919E+07	.0000
YEAR	4255	0	12	0	-.1919E+07	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	736.88	.00	4.16	5.90	1.58	29.25	10.6
FEB	611.25	.00	3.76	5.33	1.40	26.33	10.6
MAR	531.35	.00	4.16	5.90	1.43	28.73	10.6
APR	238.32	.00	4.03	5.71	1.33	27.63	10.6
MAY	69.72	.00	4.16	5.90	1.19	27.92	10.6
JUN	3.20	.00	4.03	5.71	1.07	26.74	10.6
JUL	.91	.00	4.16	5.90	1.12	27.69	10.6
AUG	1.37	.00	4.16	5.90	1.18	27.88	10.6
SEP	68.37	.00	4.03	5.71	1.09	26.80	10.6
OCT	225.72	.00	4.16	5.90	1.33	28.39	10.6
NOV	408.75	.00	4.03	5.71	1.41	27.89	10.6
DEC	752.35	.00	4.16	5.90	1.52	29.06	10.6
YEAR	3648.20	.00	48.98	69.51	15.62	334.31	10.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 198628. BTU/(SQFT-YEAR)

BLDG 826 - GYMNASIUM BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET	COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.1897E+07	
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.0000	-.1654E+07	
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.0000	-.1423E+07	
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.9515E+06	
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.6113E+06	
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-.1041E+06	
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	-.3933E+05	
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	-7478.	
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.4159E+06	
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.7568E+06	
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.1272E+07	
DEC	883.	604.	1.000	35.	0.	0.	0	12	.0000	-.1919E+07	

BLDG 826 - GYMNASIUM NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 2  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORPTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORPTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 553768.100000

FLOOR AREA (SQFT) 19827.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1919350.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 1919350.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 2146.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.330000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 48600.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 488.000000

PARTITION UA FACTOR BTU/HR-F (GUA) 0.000000E+00

DOOR UA FACTOR BTU/HR-F (DUA) 115.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	6029.0	2660.0	5718.0	3378.0
WINDOW AREA SQFT (AWND)	55.0	.0	42.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	5.5	.0	4.2	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	19827.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.900000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.035165E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.868E-04 .217E-02 .252E-02 .260E-03	867.	867.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.16 .223 -.220E-02	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1	1	
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1	1	
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.400000E-01			
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0	55.0	55.0	55.0	55.0
55.0 55.0 55.0 55.0 60.0	60.0	60.0	60.0	60.0
60.0 55.0 55.0 55.0 55.0	55.0	55.0	55.0	55.0

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET	
					POINT DEG F	
	KW	BTU/HR	PEOPLE	PEOPLE		
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	4987.	43850.	66400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.200	.000	.000	55.0	.0
2	.100	.200	.000	.000	55.0	.0
3	.100	.200	.000	.000	55.0	.0
4	.100	.200	.000	.000	55.0	.0
5	1.000	1.000	.200	.200	60.0	.0

6	1.000	1.000	.400	.400	60.0	.0	
7	1.000	1.000	.400	.400	60.0	.0	
8	1.000	1.000	.200	.200	60.0	.0	
9	1.000	1.000	.200	.200	60.0	.0	
10	1.000	1.000	.300	.300	60.0	.0	
11	1.000	1.000	.600	.600	60.0	.0	
12	1.000	1.000	.200	.200	60.0	.0	
13	1.000	1.000	.200	.200	60.0	.0	
14	1.000	1.000	.200	.200	60.0	.0	
15	1.000	1.000	.400	.400	60.0	.0	
16	1.000	1.000	.800	.800	60.0	.0	
17	1.000	1.000	.200	.200	60.0	.0	
18	1.000	1.000	.600	.600	60.0	.0	
19	1.000	1.000	.300	.300	60.0	.0	
20	.100	.200	.000	.000	60.0	.0	
21	.100	.200	.000	.000	55.0	.0	
22	.100	.200	.000	.000	55.0	.0	
23	.100	.200	.000	.000	55.0	.0	
24	.100	.200	.000	.000	55.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					26500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					6.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					3.750000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1919350.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					2399188.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 826 - GYMNASIUM NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -459.	GAIN LOSS	2. 2.	0. -31.	0. -10.	0. 0.	1. -53.	0. -1.	0. -397.	0. 0.
FEB	0. -366.	GAIN LOSS	2. 2.	0. -25.	0. -8.	0. 0.	4. -36.	0. -1.	1. -329.	0. 0.
MAR	0. -298.	GAIN LOSS	2. 2.	0. -20.	0. -7.	0. 0.	11. -25.	0. -1.	3. -289.	0. 0.
APR	0. -97.	GAIN LOSS	2. 2.	0. -9.	0. -4.	0. 0.	22. -8.	0. 0.	7. -134.	0. 0.
MAY	.00 -15.91	GAIN LOSS	2.36 2.36	1.08 -3.83	.30 -2.21	.00 .00	30.69 -2.04	.02 -.18	9.52 -79.08	.00 .00
JUN	.00 -.12	GAIN LOSS	2.41 2.41	1.46 -2.66	.28 -1.94	.00 .00	32.06 -1.11	.02 -.16	9.52 -65.97	.00 .00
JUL	.00 -.05	GAIN LOSS	2.43 2.43	1.64 -2.79	.31 -1.95	.00 .00	31.92 -1.20	.03 -.16	11.08 -69.48	.00 .00
AUG	.00 .00	GAIN LOSS	2.11 2.11	1.23 -2.86	.34 -1.85	.00 .00	28.88 -1.26	.03 -.15	10.87 -65.62	.00 .00
SEP	.00 -13.52	GAIN LOSS	1.90 1.90	.30 -4.86	.33 -2.04	.00 .00	23.13 -2.15	.03 -.17	10.97 -68.39	.00 .00
OCT	0. -80.	GAIN LOSS	2. 2.	0. -10.	0. -3.	0. 0.	15. -8.	0. 0.	7. -110.	0. 0.
NOV	0. -209.	GAIN LOSS	1. 1.	0. -18.	0. -5.	0. 0.	7. -23.	0. 0.	4. -203.	0. 0.
DEC	0. -473.	GAIN LOSS	1. 1.	0. -31.	0. -10.	0. 0.	2. -53.	0. -1.	1. -410.	0. 0.
TOT	0. -2012.	GAIN LOSS	23. 23.	6. -161.	2. -59.	0. 0.	208. -215.	0. -5.	74. -2220.	0. 0.

MAX HEATING LOAD= -1919350. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F

6098.8

BLDG 826 - GYMNASIUM NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	58.	66.	54.	4 29	16 4	63. 11.	4.16	5.90	5.36	29.22
FEB	58.	69.	53.	13 16	16 21	68. 50.	3.76	5.33	4.65	26.21
MAR	59.	81.	53.	28 9	16 21	76. 49.	4.16	5.90	4.68	28.54
APR	64.	88.	53.	30 3	16 21	84. 48.	4.03	5.71	4.36	27.45
MAY	69.	94.	55.	26 11	19 22	75. 51.	4.16	5.90	4.05	27.91
JUN	76.	96.	56.	30 18	19 3	82. 56.	4.03	5.71	3.65	26.74
JUL	81.	105.	58.	28 10	18 4	90. 57.	4.16	5.90	3.82	27.69
AUG	79.	100.	59.	29 25	16 6	95. 51.	4.16	5.90	4.00	27.86
SEP	72.	99.	53.	2 17	18 1	86. 50.	4.03	5.71	3.63	26.73
OCT	63.	88.	54.	1 15	15 21	85. 52.	4.16	5.90	4.39	28.26
NOV	60.	78.	53.	8 15	16 21	75. 50.	4.03	5.71	4.63	27.72
DEC	58.	69.	53.	23 18	17 4	62. 1.	4.16	5.90	5.00	28.87
YEAR							48.98	69.51	52.21	333.20



BLDG 826 - GYMNASIUM NIGHT SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED							
MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU		
	HEATING		HEATING	COOLING	HEATING	COOLING	
JAN	694	0	0	0	-.1825E+07	.0000	
FEB	611	0	0	0	-.1646E+07	.0000	
MAR	577	0	0	0	-.1453E+07	.0000	
APR	323	0	0	0	-.9694E+06	.0000	
MAY	108	0	0	0	-.6365E+06	.0000	
JUN	2	0	0	0	-.1031E+06	.0000	
JUL	1	0	0	0	-.4597E+05	.0000	
AUG	0	0	0	0	.0000	.0000	
SEP	103	0	0	0	-.4935E+06	.0000	
OCT	348	0	0	0	-.7563E+06	.0000	
NOV	473	0	0	0	-.1226E+07	.0000	
DEC	688	0	8	0	-.1919E+07	.0000	
YEAR	3928	0	8	0	-.1919E+07	.0000	

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	679.58	.00	4.16	5.90	1.57	29.22	10.6	
FEB	562.74	.00	3.76	5.33	1.36	26.21	10.6	
MAR	479.84	.00	4.16	5.90	1.37	28.54	10.6	
APR	199.32	.00	4.03	5.71	1.28	27.45	10.6	
MAY	54.20	.00	4.16	5.90	1.19	27.91	10.6	
JUN	.91	.00	4.03	5.71	1.07	26.74	10.6	
JUL	.46	.00	4.16	5.90	1.12	27.69	10.6	
AUG	.00	.00	4.16	5.90	1.17	27.86	10.6	
SEP	49.41	.00	4.03	5.71	1.06	26.73	10.6	
OCT	192.78	.00	4.16	5.90	1.29	28.26	10.6	
NOV	358.64	.00	4.03	5.71	1.36	27.72	10.6	
DEC	699.09	.00	4.16	5.90	1.47	28.87	10.6	
YEAR	3276.98	.00	48.98	69.51	15.30	333.20	10.6	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 179849. BTU/(SQFT-YEAR)

BLDG 826 - GYMNASIUM NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX TEMP.	SYSTEM DRIFT	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY		DEG. F	DEG. F + -	COOL	HEAT	BTU	BTU	
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.1825E+07
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.0000	-.1646E+07
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.0000	-.1453E+07
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.9694E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.6365E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-.1031E+06
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	-.4597E+05
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.4935E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.7563E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.1226E+07
DEC	883.	604.	1.000	35.	0.	0.	0	8	.0000	-.1919E+07

BLDG 826 - GYMNASIUM DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 2  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 553768.100000

FLOOR AREA (SQFT) 19827.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1919350.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 1919350.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 2146.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.330000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 48600.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 488.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 115.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	6029.0	2660.0	5718.0	3378.0
WINDOW AREA SQFT (AWND)	55.0	.0	42.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	5.5	.0	4.2	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	19827.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.900000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.035165E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.868E-04 .217E-02 .252E-02 .260E-03	867.	867.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.16 .223 -.220E-02	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1	1	
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1	1	
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.400000E-01			
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0
55.0	55.0	55.0	58.0	58.0
58.0	55.0	55.0	55.0	55.0

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
	KW	BTU/HR				
		PEOPLE	PEOPLE			
	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	4987.	43850.	66400.		
HOURLY	FRACTION OF PEAK					
1	.100	.200	.000	.000	55.0	.0
2	.100	.200	.000	.000	55.0	.0
3	.100	.200	.000	.000	55.0	.0
4	.100	.200	.000	.000	55.0	.0
5	1.000	1.000	.200	.200	58.0	.0

6	1.000	1.000	.400	.400	58.0	.0
7	1.000	1.000	.400	.400	58.0	.0
8	1.000	1.000	.200	.200	58.0	.0
9	1.000	1.000	.200	.200	58.0	.0
10	1.000	1.000	.300	.300	58.0	.0
11	1.000	1.000	.600	.600	58.0	.0
12	1.000	1.000	.200	.200	58.0	.0
13	1.000	1.000	.200	.200	58.0	.0
14	1.000	1.000	.200	.200	58.0	.0
15	1.000	1.000	.400	.400	58.0	.0
16	1.000	1.000	.800	.800	58.0	.0
17	1.000	1.000	.200	.200	58.0	.0
18	1.000	1.000	.600	.600	58.0	.0
19	1.000	1.000	.300	.300	58.0	.0
20	.100	.200	.000	.000	58.0	.0
21	.100	.200	.000	.000	55.0	.0
22	.100	.200	.000	.000	55.0	.0
23	.100	.200	.000	.000	55.0	.0
24	.100	.200	.000	.000	55.0	.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					26500.000000	
ECONOMIZER HIGH TEMP LIMIT F					100.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					6.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					3.750000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1919350.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					2399188.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400
.500	.537	.600	.625	.700	.718	.800
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					4	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10	
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000			

BLDG 826 - GYMNASIUM DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	2.	0.	0.	0.	2.	0.	0.	0.
	-433.	LOSS		-30.	-10.	0.	-50.	-1.	-376.	0.
FEB	0.	GAIN	2.	0.	0.	0.	5.	0.	1.	0.
	-344.	LOSS		-24.	-8.	0.	-34.	-1.	-311.	0.
MAR	0.	GAIN	2.	0.	0.	0.	12.	0.	3.	0.
	-276.	LOSS		-19.	-7.	0.	-24.	-1.	-272.	0.
APR	0.	GAIN	2.	0.	0.	0.	23.	0.	8.	0.
	-86.	LOSS		-9.	-4.	0.	-8.	0.	-126.	0.
MAY	.00	GAIN	2.36	1.11	.31	.00	31.06	.03	10.14	.00
	-12.65	LOSS		-3.68	-2.15	.00	-1.91	-.18	-77.19	.00
JUN	.00	GAIN	2.41	1.46	.29	.00	32.06	.02	9.58	.00
	-.01	LOSS		-2.66	-1.94	.00	-1.11	-.16	-65.93	.00
JUL	.00	GAIN	2.43	1.64	.31	.00	31.93	.03	11.14	.00
	.00	LOSS		-2.79	-1.95	.00	-1.20	-.16	-69.50	.00
AUG	.00	GAIN	2.11	1.23	.34	.00	28.88	.03	10.87	.00
	.00	LOSS		-2.86	-1.85	.00	-1.26	-.15	-65.62	.00
SEP	.00	GAIN	1.90	.31	.34	.00	23.34	.03	11.58	.00
	-10.76	LOSS		-4.74	-2.00	.00	-2.00	-.17	-66.79	.00
OCT	0.	GAIN	2.	0.	0.	0.	16.	0.	8.	0.
	-68.	LOSS		-10.	-3.	0.	-7.	0.	-102.	0.
NOV	0.	GAIN	1.	0.	0.	0.	7.	0.	4.	0.
	-193.	LOSS		-17.	-5.	0.	-21.	0.	-190.	0.
DEC	0.	GAIN	1.	0.	0.	0.	2.	0.	1.	0.
	-448.	LOSS		-30.	-10.	0.	-51.	-1.	-390.	0.
TOT	0.	GAIN	23.	6.	2.	0.	213.	0.	78.	0.
	-1872.	LOSS		-155.	-56.	0.	-202.	-5.	-2112.	0.

MAX HEATING LOAD= -1919350. BTUH ON DEC 18 HOUR 9  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24

AMBIENT TEMP 3.  
 AMBIENT TEMP 42.

ZONE UA BTU/HR-F

6098.8

BLDG 826 - GYMNASIUM DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	57.	66.	54.	4 29	16 4	63. 11.	4.16	5.90	5.38	29.24
FEB	57.	69.	54.	13 8	16 21	68. 53.	3.76	5.33	4.66	26.22
MAR	58.	81.	55.	28 15	16 4	76. 18.	4.16	5.90	4.66	28.53
APR	63.	88.	53.	30 16	16 1	84. 50.	4.03	5.71	4.36	27.46
MAY	69.	94.	55.	26 11	19 22	75. 51.	4.16	5.90	4.05	27.91
JUN	76.	96.	56.	30 18	19 3	82. 56.	4.03	5.71	3.65	26.74
JUL	81.	105.	58.	28 10	18 4	90. 57.	4.16	5.90	3.82	27.69
AUG	79.	100.	59.	29 25	16 6	95. 51.	4.16	5.90	4.00	27.86
SEP	72.	99.	53.	2 17	18 1	86. 50.	4.03	5.71	3.63	26.73
OCT	63.	88.	54.	1 15	15 21	85. 52.	4.16	5.90	4.39	28.25
NOV	59.	78.	55.	8 2	16 24	75. 20.	4.03	5.71	4.63	27.73
DEC	57.	69.	53.	23 18	17 4	62. 1.	4.16	5.90	5.01	28.87
YEAR							48.98	69.51	52.24	333.23



BLDG 826 - GYMNASIUM DDC (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED			NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER		HEATING	COOLING	HEATING	COOLING
JAN	687	0		0	0	-.1730E+07	.0000
FEB	607	0		0	0	-.1549E+07	.0000
MAR	567	0		0	0	-.1356E+07	.0000
APR	314	0		0	0	-.8746E+06	.0000
MAY	83	0		0	0	-.5409E+06	.0000
JUN	1	0		0	0	-9489.	.0000
JUL	0	0		0	0	.0000	.0000
AUG	0	0		0	0	.0000	.0000
SEP	93	0		0	0	-.3990E+06	.0000
OCT	318	0		0	0	-.6782E+06	.0000
NOV	461	0		0	0	-.1155E+07	.0000
DEC	689	0		8	0	-.1919E+07	.0000
YEAR	3820	0		8	0	-.1919E+07	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU		
JAN	650.45	.00	4.16	5.90	1.58	29.24	10.6	
FEB	538.19	.00	3.76	5.33	1.37	26.22	10.6	
MAR	454.57	.00	4.16	5.90	1.37	28.53	10.6	
APR	186.20	.00	4.03	5.71	1.28	27.46	10.6	
MAY	41.62	.00	4.16	5.90	1.19	27.91	10.6	
JUN	.46	.00	4.03	5.71	1.07	26.74	10.6	
JUL	.00	.00	4.16	5.90	1.12	27.69	10.6	
AUG	.00	.00	4.16	5.90	1.17	27.86	10.6	
SEP	43.55	.00	4.03	5.71	1.06	26.73	10.6	
OCT	171.35	.00	4.16	5.90	1.29	28.25	10.6	
NOV	338.75	.00	4.03	5.71	1.36	27.73	10.6	
DEC	673.19	.00	4.16	5.90	1.47	28.87	10.6	
YEAR	3098.32	.00	48.98	69.51	15.31	333.23	10.6	

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 170840. BTU/(SQFT-YEAR)

BLDG 826 - GYMNASIUM DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.1730E+07
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.0000	-.1549E+07
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.0000	-.1356E+07
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.8746E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.5409E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-9489.
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.3990E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.6782E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.1155E+07
DEC	883.	604.	1.000	35.	0.	0.	0	8	.0000	-.1919E+07

BLDG 826 - GYMNASIUM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO  
 STATION 13995 YEAR 1955  
 SITE LATITUDE DEG (AL1) 37.750000  
 ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000  
 MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000  
 AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000  
 SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01  
 SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01  
 SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01  
 INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000  
 INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000  
 INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03  
 INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00  
 VOLUME OF ZONE IN CUBIC FEET (VOLHS) 553768.100000  
 FLOOR AREA (SQFT) 19827.000000  
 HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1919350.000000  
 COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00  
 COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 1919350.000000  
 CONSTANT INFILTRATION RATE CFM (CFMI) 2146.000000

INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 2.330000E-01  
 B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02  
 C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03  
 BUILDING THERMAL MASS MCP BTU/F (CMCP) 48600.000000  
 BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00  
 SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 488.000000  
 PARTITION UA BTU/HR-F (GUA) 0.000000E+00  
 DOOR UA BTU/HR-F (DUA) 115.000000  
 WINDOW GLASS NUMBER (NG) 30  
 DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01  
 NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01  
 WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	6029.0	2660.0	5718.0	3378.0
WINDOW AREA SQFT (AWND)	55.0	.0	42.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	5.5	.0	4.2	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	19827.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.900000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.035165E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.868E-04 .217E-02 .252E-02 .260E-03	867.	867.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.16 .223 -.220E-02	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKO)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		4.400000E-01		

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F		
KW		BTU/HR					
		PEOPLE		PEOPLE			
		LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
PEAK VAL	8.	4987.	43850.	66400.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.200	.000	.000	60.0	.0	
2	.100	.200	.000	.000	60.0	.0	
3	.100	.200	.000	.000	60.0	.0	
4	.100	.200	.000	.000	60.0	.0	
5	1.000	1.000	.200	.200	60.0	.0	
6	1.000	1.000	.400	.400	60.0	.0	
7	1.000	1.000	.400	.400	60.0	.0	
8	1.000	1.000	.200	.200	60.0	.0	
9	1.000	1.000	.200	.200	60.0	.0	
10	1.000	1.000	.300	.300	60.0	.0	
11	1.000	1.000	.600	.600	60.0	.0	
12	1.000	1.000	.200	.200	60.0	.0	

13	1.000	1.000	.200	.200	60.0	.0	
14	1.000	1.000	.200	.200	60.0	.0	
15	1.000	1.000	.400	.400	60.0	.0	
16	1.000	1.000	.800	.800	60.0	.0	
17	1.000	1.000	.200	.200	60.0	.0	
18	1.000	1.000	.600	.600	60.0	.0	
19	1.000	1.000	.300	.300	60.0	.0	
20	.100	.200	.000	.000	60.0	.0	
21	.100	.200	.000	.000	60.0	.0	
22	.100	.200	.000	.000	60.0	.0	
23	.100	.200	.000	.000	60.0	.0	
24	.100	.200	.000	.000	60.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					26500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP (TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					6.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					3.750000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1919350.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					2399188.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 826 - GYMNASIUM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MONTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. GAIN -476. LOSS		2.	0. -34.	0. -11.	0. 0.	1. -60.	0. -1.	0. -402.	0. 0.
FEB	0. GAIN -382. LOSS		2.	0. -27.	0. -9.	0. 0.	3. -42.	0. -1.	1. -335.	0. 0.
MAR	0. GAIN -315. LOSS		2.	0. -22.	0. -8.	0. 0.	10. -30.	0. -1.	2. -297.	0. 0.
APR	0. GAIN -109. LOSS		2.	0. -11.	0. -4.	0. 0.	20. -12.	0. 0.	7. -139.	0. 0.
MAY	.00 GAIN -20.74 LOSS		2.36	.93 -4.54	.29 -2.53	.00 .00	29.58 -3.34	.02 -.21	9.57 -80.33	.00 .00
JUN	.00 GAIN -.31 LOSS		2.41	1.34 -3.04	.28 -2.12	.00 .00	31.36 -1.77	.02 -.17	9.48 -63.93	.00 .00
JUL	.00 GAIN -.04 LOSS		2.43	1.53 -3.17	.30 -2.13	.00 .00	31.26 -1.89	.03 -.18	11.06 -67.54	.00 .00
AUG	.00 GAIN .00 LOSS		2.11	1.12 -3.22	.33 -2.02	.00 .00	28.22 -1.90	.03 -.17	10.80 -63.60	.00 .00
SEP	.00 GAIN -20.12 LOSS		1.90	.21 -5.76	.31 -2.41	.00 .00	21.95 -3.73	.03 -.20	10.90 -70.57	.00 .00
OCT	0. GAIN -94. LOSS		2.	0. -12.	0. -4.	0. 0.	14. -11.	0. 0.	7. -118.	0. 0.
NOV	0. GAIN -225. LOSS		1.	0. -20.	0. -6.	0. 0.	6. -27.	0. -1.	3. -210.	0. 0.
DEC	0. GAIN -489. LOSS		1.	0. -34.	0. -11.	0. 0.	1. -60.	0. -1.	0. -415.	0. 0.
TOT	0. GAIN -2131. LOSS		23.	5. -179.	2. -66.	0. 0.	198. -256.	0. -6.	73. -2262.	0. 0.

MAX HEATING LOAD= -1919350. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24      AMBIENT TEMP 42.

ZONE UA BTU/HR-F 6098.8

BLDG 826 - GYMNASIUM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	66.	59.	4 29	16 4	63. 11.	4.16	5.90	5.39	29.25
FEB	60.	69.	60.	13 13	16 22	68. 58.	3.76	5.33	4.74	26.30
MAR	61.	80.	59.	28 9	16 20	76. 55.	4.16	5.90	4.83	28.69
APR	65.	88.	58.	30 1	16 6	84. 61.	4.03	5.71	4.50	27.60
MAY	70.	95.	59.	26 11	19 21	75. 54.	4.16	5.90	4.05	27.92
JUN	77.	98.	60.	30 19	19 5	82. 58.	4.03	5.71	3.65	26.74
JUL	81.	106.	60.	28 10	19 4	82. 57.	4.16	5.90	3.82	27.69
AUG	80.	101.	61.	11 25	19 4	84. 54.	4.16	5.90	4.00	27.86
SEP	73.	99.	58.	2 14	18 19	86. 53.	4.03	5.71	3.68	26.78
OCT	65.	88.	59.	1 17	15 20	85. 55.	4.16	5.90	4.48	28.35
NOV	62.	78.	59.	8 13	16 18	75. 55.	4.03	5.71	4.77	27.86
DEC	60.	69.	55.	23 18	18 8	55. 1.	4.16	5.90	5.18	29.04
YEAR							48.98	69.51	53.09	334.07



BLDG 826 - GYMNASIUM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	714	0	0	0	-.1777E+07	.0000
FEB	628	0	0	0	-.1558E+07	.0000
MAR	607	0	0	0	-.1343E+07	.0000
APR	372	0	0	0	-.8834E+06	.0000
MAY	134	0	0	0	-.5601E+06	.0000
JUN	7	0	0	0	-.1031E+06	.0000
JUL	2	0	0	0	-.3169E+05	.0000
AUG	0	0	0	0	.0000	.0000
SEP	134	0	0	0	-.3794E+06	.0000
OCT	380	0	0	0	-.6932E+06	.0000
NOV	522	0	0	0	-.1184E+07	.0000
DEC	712	0	9	0	-.1919E+07	.0000
YEAR	4212	0	9	0	-.1919E+07	.0000

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	704.31	.00	4.16	5.90	1.58	29.25	10.6
FEB	583.67	.00	3.76	5.33	1.39	26.30	10.6
MAR	507.08	.00	4.16	5.90	1.41	28.69	10.6
APR	228.73	.00	4.03	5.71	1.32	27.60	10.6
MAY	67.82	.00	4.16	5.90	1.19	27.92	10.6
JUN	3.20	.00	4.03	5.71	1.07	26.74	10.6
JUL	.91	.00	4.16	5.90	1.12	27.69	10.6
AUG	.00	.00	4.16	5.90	1.17	27.86	10.6
SEP	65.29	.00	4.03	5.71	1.08	26.78	10.6
OCT	215.16	.00	4.16	5.90	1.31	28.35	10.6
NOV	391.31	.00	4.03	5.71	1.40	27.86	10.6
DEC	721.87	.00	4.16	5.90	1.52	29.04	10.6
YEAR	3489.36	.00	48.98	69.51	15.55	334.07	10.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 190605. BTU/(SQFT-YEAR)

BLDG 826 - GYMNASIUM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX TEMP.	SYSTEM DRIFT	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	INSOL. SURF. BTU/ SQFT- DAY	INSOL. SURF. BTU/ SQFT- DAY		DEG. F	DEG. F	COOL	HEAT	BTU	BTU	
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.1777E+07
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.0000	-.1558E+07
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.0000	-.1343E+07
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.0000	-.8834E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.0000	-.5601E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.0000	-.1031E+06
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.0000	-.3169E+05
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.0000	.0000
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.0000	-.3794E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.0000	-.6932E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.0000	-.1184E+07
DEC	883.	604.	1.000	35.	0.	0.	0	9	.0000	-.1919E+07

BLDG 826 - GYMNASIUM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 0  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 553768.100000

FLOOR AREA (SQFT) 19827.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 1919350.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) 0.000000E+00

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 1919350.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 2146.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 2.330000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 48600.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 488.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 115.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 6.200000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	6029.0	2660.0	5718.0	3378.0
WINDOW AREA SQFT (AWND)	55.0	.0	42.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	5.5	.0	4.2	.0
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.245	.245	.245	.245
WALL TRANSFER FUNCTIONS				
CN FACTORS	.01837	.01837	.01837	.01837
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00003	.00003	.00003	.00003
N=2	.00283	.00283	.00283	.00283
N=3	.01017	.01017	.01017	.01017
N=4	.00498	.00498	.00498	.00498
N=5	.00037	.00037	.00037	.00037
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.50943	-1.50943	-1.50943	-1.50943
N=3	.65654	.65654	.65654	.65654
N=4	-.07415	-.07415	-.07415	-.07415
N=5	.00212	.00212	.00212	.00212
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	19827.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.900000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	5.035165E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.868E-04 .217E-02 .252E-02 .260E-03	867.	867.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.16 .223 -.220E-02	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.400000E-01			

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	KW	BTU/HR		HEATING	COOLING
		LIGHTS	PROCESS	PEOPLE SENSIBLE		
		8.	4987.	43850.	66400.	
		HOURLY FRACTION OF PEAK				
1		.100	.200	.000	.000	60.0 .0
2		.100	.200	.000	.000	60.0 .0
3		.100	.200	.000	.000	60.0 .0
4		.100	.200	.000	.000	60.0 .0
5		1.000	1.000	.200	.200	60.0 .0
6		1.000	1.000	.400	.400	60.0 .0
7		1.000	1.000	.400	.400	60.0 .0
8		1.000	1.000	.200	.200	60.0 .0
9		1.000	1.000	.200	.200	60.0 .0
10		1.000	1.000	.300	.300	60.0 .0
11		1.000	1.000	.600	.600	60.0 .0
12		1.000	1.000	.200	.200	60.0 .0

13	1.000	1.000	.200	.200	60.0	.0	
14	1.000	1.000	.200	.200	60.0	.0	
15	1.000	1.000	.400	.400	60.0	.0	
16	1.000	1.000	.800	.800	60.0	.0	
17	1.000	1.000	.200	.200	60.0	.0	
18	1.000	1.000	.600	.600	60.0	.0	
19	1.000	1.000	.300	.300	60.0	.0	
20	.100	.200	.000	.000	60.0	.0	
21	.100	.200	.000	.000	60.0	.0	
22	.100	.200	.000	.000	60.0	.0	
23	.100	.200	.000	.000	60.0	.0	
24	.100	.200	.000	.000	60.0	.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					60.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					100.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					26500.000000		
ECONOMIZER HIGH TEMP LIMIT F					100.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					6.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					3.750000E-01		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					1919350.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					2399188.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					4		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					1.000000E-10		
COOLING PLANT RATED INPUT BTU (CFLIN)					0.000000E+00		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000	.000	.000	.000	.000
.000	.000	.000	.000				

BLDG 826 - GYMNASIUM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	2.	0.	0.	0.	1.	0.	0.	0.
	-491.	LOSS		-34.	-11.	0.	-60.	-1.	-418.	0.
FEB	0.	GAIN	2.	0.	0.	0.	3.	0.	0.	0.
	-395.	LOSS		-27.	-9.	0.	-42.	-1.	-348.	0.
MAR	0.	GAIN	2.	0.	0.	0.	10.	0.	2.	0.
	-327.	LOSS		-22.	-8.	0.	-30.	-1.	-309.	0.
APR	0.	GAIN	2.	0.	0.	0.	21.	0.	7.	0.
	-115.	LOSS		-11.	-4.	0.	-11.	0.	-146.	0.
MAY	.00	GAIN	2.36	1.04	.32	.00	30.30	.03	9.03	.00
	-22.86	LOSS		-4.18	-2.38	.00	-2.72	-.19	-83.93	.00
JUN	.00	GAIN	2.41	1.47	.30	.00	32.13	.03	9.00	.00
	-.36	LOSS		-2.66	-1.95	.00	-1.14	-.16	-65.75	.00
JUL	.00	GAIN	2.43	1.67	.33	.00	32.05	.03	10.59	.00
	-.05	LOSS		-2.76	-1.96	.00	-1.19	-.16	-69.20	.00
AUG	.00	GAIN	2.11	1.28	.37	.00	29.09	.03	10.20	.00
	-.01	LOSS		-2.82	-1.85	.00	-1.23	-.15	-65.35	.00
SEP	.00	GAIN	1.90	.27	.34	.00	22.55	.03	10.36	.00
	-22.64	LOSS		-5.39	-2.28	.00	-3.15	-.19	-74.34	.00
OCT	0.	GAIN	2.	0.	0.	0.	14.	0.	7.	0.
	-100.	LOSS		-12.	-4.	0.	-11.	0.	-124.	0.
NOV	0.	GAIN	1.	0.	0.	0.	6.	0.	3.	0.
	-235.	LOSS		-20.	-6.	0.	-27.	-1.	-220.	0.
DEC	0.	GAIN	1.	0.	0.	0.	1.	0.	0.	0.
	-503.	LOSS		-34.	-11.	0.	-60.	-1.	-429.	0.
TOT	0.	GAIN	23.	6.	2.	0.	203.	0.	69.	0.
	-2210.	LOSS		-176.	-65.	0.	-251.	-5.	-2352.	0.

MAX HEATING LOAD= -1919350. BTUH ON DEC 18 HOUR 8  
 MAX COOLING LOAD= 0. BTUH ON DEC 31 HOUR 24

AMBIENT TEMP 1.  
 AMBIENT TEMP 42.

ZONE UA BTU/HR-F

6098.8

BLDG 826 - GYMNASIUM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	60.	66.	59.	4 29	16 4	63. 11.	4.16	5.90	5.39	29.25
FEB	60.	68.	59.	13 2	16 3	68. 15.	3.76	5.33	4.76	26.32
MAR	61.	81.	59.	28 12	16 1	76. 58.	4.16	5.90	4.85	28.71
APR	65.	89.	58.	30 1	16 6	84. 61.	4.03	5.71	4.53	27.63
MAY	70.	94.	59.	26 9	19 20	75. 54.	4.16	5.90	4.05	27.92
JUN	76.	96.	60.	30 19	19 5	82. 58.	4.03	5.71	3.65	26.74
JUL	81.	105.	60.	28 10	18 4	90. 57.	4.16	5.90	3.82	27.69
AUG	79.	100.	60.	29 25	16 6	95. 51.	4.16	5.90	4.02	27.88
SEP	73.	99.	59.	2 16	18 9	86. 61.	4.03	5.71	3.71	26.80
OCT	65.	88.	59.	1 3	15 2	85. 58.	4.16	5.90	4.52	28.39
NOV	62.	79.	59.	8 9	16 14	75. 55.	4.03	5.71	4.78	27.88
DEC	60.	68.	53.	23 18	17 4	62. 1.	4.16	5.90	5.19	29.05
YEAR							48.98	69.51	53.28	334.26



BLDG 826 - GYMNASIUM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING	NUMBER OF HOURS WHEN		MAXIMUM LOADS	
		INCLUDING	LOADS WERE NOT MET		BTU	
		ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	715	0	0	0	-.1897E+07	.0000
FEB	631	0	0	0	-.1654E+07	.0000
MAR	612	0	0	0	-.1423E+07	.0000
APR	376	0	0	0	-.9515E+06	.0000
MAY	133	0	0	0	-.6114E+06	.0000
JUN	7	0	0	0	-.1034E+06	.0000
JUL	2	0	0	0	-.3945E+05	.0000
AUG	3	0	0	0	-7507.	.0000
SEP	139	0	0	0	-.4159E+06	.0000
OCT	389	0	0	0	-.7569E+06	.0000
NOV	523	0	0	0	-.1272E+07	.0000
DEC	714	0	11	0	-.1919E+07	.0000
YEAR	4244	0	11	0	-.1919E+07	.0000

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	721.14	.00	4.16	5.90	1.58	29.25	10.6
FEB	598.16	.00	3.76	5.33	1.40	26.32	10.6
MAR	520.15	.00	4.16	5.90	1.42	28.71	10.6
APR	235.79	.00	4.03	5.71	1.33	27.63	10.6
MAY	68.77	.00	4.16	5.90	1.19	27.92	10.6
JUN	3.20	.00	4.03	5.71	1.07	26.74	10.6
JUL	.91	.00	4.16	5.90	1.12	27.69	10.6
AUG	1.37	.00	4.16	5.90	1.18	27.88	10.6
SEP	68.33	.00	4.03	5.71	1.09	26.80	10.6
OCT	223.77	.00	4.16	5.90	1.33	28.39	10.6
NOV	402.10	.00	4.03	5.71	1.40	27.88	10.6
DEC	737.44	.00	4.16	5.90	1.52	29.05	10.6
YEAR	3581.12	.00	48.98	69.51	15.61	334.26	10.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 195243. BTU/(SQFT-YEAR)

BLDG 826 - GYMNASIUM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F +	SYSTEM DRIFT DEG. F -	HOURS WHEN SYSTEM LOADS NOT MET COOL HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0 0	.0000	-.1897E+07
FEB	1464.	929.	1.000	37.	0.	0.	0 0	.0000	-.1654E+07
MAR	1922.	1254.	1.000	43.	0.	0.	0 0	.0000	-.1423E+07
APR	2312.	1600.	1.000	55.	0.	0.	0 0	.0000	-.9515E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0 0	.0000	-.6114E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0 0	.0000	-.1034E+06
JUL	2546.	2015.	1.000	77.	0.	0.	0 0	.0000	-.3945E+05
AUG	2280.	1840.	1.000	76.	0.	0.	0 0	.0000	-7507.
SEP	1856.	1371.	1.000	68.	0.	0.	0 0	.0000	-.4159E+06
OCT	1437.	953.	1.000	57.	0.	0.	0 0	.0000	-.7569E+06
NOV	1039.	732.	1.000	47.	0.	0.	0 0	.0000	-.1272E+07
DEC	883.	604.	1.000	35.	0.	0.	0 11	.0000	-.1919E+07

**COMPUTER SIMULATIONS**

BUILDING 1350

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 18-Mar-93  
BUILDING NO.: 1350  
BLDG. TYPE: RESERVE CENTER

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	610.9	447.4	373.8	373.8	34.6	54.8
COOLING (kWH)	21900	18495	16358	16243	21900	20193

SUPPLY AIR FAN	15286 CFM
FLOOR AREA	17677 FT <sup>2</sup>
CFMI	1188 CFM
UA	3851 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	500	2000	75 HR	HR. ON HEATING	2730 HR/YR
SAT.	500	2000	15 HR	HR. ON COOLING	1830 HR/YR
SUN.	500	2000	15 HR	HR. OFF HEATING	1638 HR/YR
	TOTAL OCCUPY HR.		105 HR/WK	HR. OFF COOLING	1098 HR/YR
	TOTAL UNOCC. HR.		63 HR/WK		
	ANNUAL OCCUPY HR.		5475 HR/YR		
	ANNUAL UNOCC. HR.		3285 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 2730 = 1638 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 1830 = 1098 HR/YR

HOAUHC	610.9 MBtu	-	34.6 MBtu	=	1.48E+02 Btu/CFM-HR
	1188 CFM	*	3285 HR/YR		
HOAUH	610.9 MBtu	-	34.6 MBtu	=	2.96E+02 Btu/CFM-HR
	1188 CFM	*	1638 HR/YR		
COAUHC	21900 kWH	-	21900 kWH	=	0.00E+00 kWH/CFM-HR
	1188 CFM	*	3285 HR/YR		
COAUC	21900 kWH	-	21900 kWH	=	0.00E+00 kWH/CFM-HR
	1188 CFM	*	1098 HR/YR		
HOAOHC	610.9 MBtu	-	54.8 MBtu	=	8.55E+01 Btu/CFM-HR
	1188 CFM	*	5475 HR/YR		
HOAOH	610.9 MBtu	-	54.8 MBtu	=	1.71E+02 Btu/CFM-HR
	1188 CFM	*	2730 HR/YR		
COAOHC	21900 kWH	-	20193 kWH	=	2.62E-04 kWH/CFM-HR
	1188 CFM	*	5475 HR/YR		
COAOC	21900 kWH	-	20193 kWH	=	7.85E-04 kWH/CFM-HR
	1188 CFM	*	1830 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 18-Mar-93  
BUILDING NO.: 1350  
BLDG. TYPE: RESERVE CENTER

**ENERGY CONSTANT CALCULATIONS**

ECC	16358 KWH -	16243 KWH	=	4.11E-06 KWH/CFM-HR
	15286 CFM *	1830 HR/YR		
ECHC	16358 KWH -	16243 KWH	=	1.37E-06 KWH/CFM-HR
	15286 CFM *	5475 HR/YR		
NSUCHC	21900 KWH -	18495 KWH	=	6.78E-05 KWH/CFM-HR
	15286 CFM *	3285 HR/YR		
NSUC	21900 KWH -	18495 KWH	=	2.03E-04 KWH/CFM-HR
	15286 CFM *	1098 HR/YR		
DDCCHC	18495 KWH -	16358 KWH	=	2.55E-05 KWH/CFM-HR
	15286 CFM *	5475 HR/YR		
DDCC	18495 KWH -	16358 KWH	=	7.64E-05 KWH/CFM-HR
	15286 CFM *	1830 HR/YR		
NSC	610.9 MBtu -	447.4 MBtu	=	4.25E+04 Btu/UA
	3851 UA			
DSC	447.4 MBtu -	373.8 MBtu	=	1.91E+04 Btu/UA
	3851 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -		294 HR/YR	
			=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			
			=	13.9 KWH/TON
OAP	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 16-Feb-93

BY: BHS

JOB: 3204.000

CHK:

FILE: 1350BLZ1

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 1350 BLDG NAME: RESERVE CENTER

BLDG FUNCTION: KITCHEN

FLOOR AREA: (SQ. FT) 648

# FLOORS 1

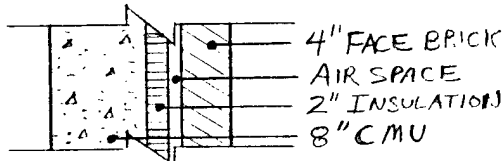
SLAB PERIMETER: (FT) 36

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	57	57	0	629	743
GLASS	(SQ. FT)	0	0	0	6	6
PERSONNEL DOOR	(SQ. FT)	0	0	0	22	22
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	57	57	0	601	715
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					648
INSULATED PANEL	(SQ. FT)	0		PERSONNEL DOOR	(SQ. FT)	22
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

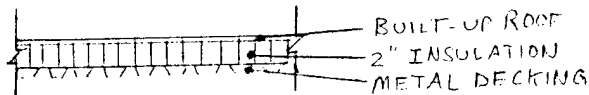
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. RIGID INSULATION	5.00
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.21
U=1/R	0.109

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. 2" RIGID INSULATION	6.68
4. AIR SPACE	1.00
5. BATT INSULATION	30.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	40.65
U=1/R	0.025

GLASS TYPE: DOUBLE PANE

SLAB TYPE FLOOR: CONCRETE

BASEMENT TYPE: NONE

INSULATED PANEL: NONE

PERSONNEL DOOR TYPE: METAL

R-GLASS	1.61
SLF	0.67
R-BASEM.	0.00
R-PANEL	4.20
R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	743	X CFM / SQ.FT.	0.115	= 85
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	3	X CFM / OPENING /HR	1.600	=	5
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING /HR	1.385	=	0
TOTAL INFILTRATION (CFM)				=	90

UA PANEL	= PANEL AREA	0	X PANEL "U"	0.238	=	0
UA PDOOR	= PDOOR AREA	22	X DOOR "U"	0.391	=	8
UA WALL	= WALL AREA	715	X WALL "U"	0.109	=	78
UA ROOF	= ROOF AREA	648	X ROOF "U"	0.025	=	16
UA GLASS	= GLASS AREA	6	X GLASS "U"	0.621	=	4
UA SLAB	= SLAB PERIM.	36	X SLF	0.670	=	24
UA BASEM.	= B-WALL AREA	0	X BASE "U"	0.000	=	0
INFILTRATION	= CFM	90	X A. T. F.	1.035	=	93

**TOTAL UA (BTU/HR°F) 223**

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 24-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 1350BLZ2

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 1350 BLDG NAME: RESERVE CENTER

BLDG FUNCTION: SHIPPING / SUPPLY

FLOOR AREA: (SQ. FT) 4,728

# FLOORS 1

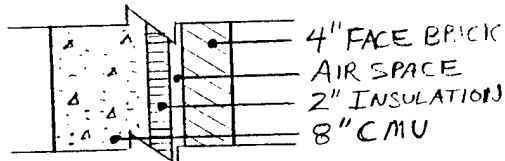
SLAB PERIMETER: (FT) 259

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,834	672	560	560	3,626
GLASS	(SQ. FT)	12	0	12	12	36
PERSONNEL DOOR	(SQ. FT)	42	0	42	42	126
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	1,780	672	506	506	3,464
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 4,728
INSULATED PANEL	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)		126
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

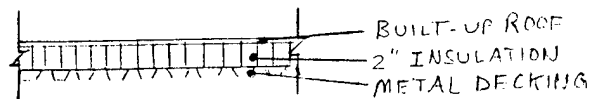
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. RIGID INSULATION	5.00
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.21
U=1/R	0.109

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECK	0.00
5.	
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	7.87
U=1/R	0.127

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:	NONE	R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	3626	X CFM / SQ.FT.	0.115	= 417
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	15		X CFM / OPENING / HR	1.385	= 21
TOTAL INFILTRATION (CFM)				=	438

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	126	X DOOR 'U'	0.391	=	49
UA WALL	= WALL AREA	3,464	X WALL 'U'	0.109	=	376
UA ROOF	= ROOF AREA	4,728	X ROOF 'U'	0.127	=	601
UA GLASS	= GLASS AREA	36	X GLASS 'U'	0.621	=	22
UA SLAB	= SLAB PERIM.	259	X SLF	0.670	=	174
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	438	X A. T. F.	1.035	=	453

**TOTAL UA (BTU/HR°F) 1,675**



**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 16-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 1350BLZ3

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 1350 BLDG NAME: RESERVE CENTER

BLDG FUNCTION: CLASSROOMS

FLOOR AREA: (SQ. FT)

4,357

# FLOORS 1

SLAB PERIMETER: (FT)

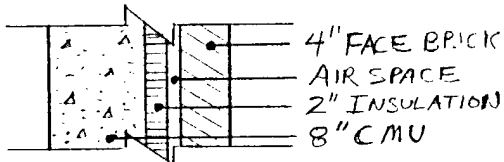
120

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	910	0	770	1,680
GLASS	(SQ. FT)	0	55	0	15	70
PERSONNEL DOOR	(SQ. FT)	0	21	0	21	42
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	834	0	734	1,568
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					4,357
INSULATED PANEL	(SQ. FT)	0				
PERSONNEL DOOR	(SQ. FT)					42
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

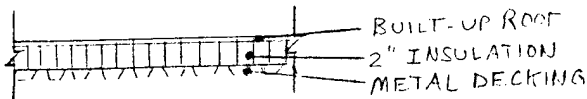
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. RIGID INSULATION	5.00
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.21
U=1/R	0.109

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. 2" RIGID INSULATION	6.68
4. AIR SPACE	1.00
5. BATT INSULATION	30.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	40.65
U=1/R	0.025

GLASS TYPE: DOUBLE PANE

SLAB TYPE FLOOR: CONCRETE

BASEMENT TYPE: NONE

INSULATED PANEL: NONE

PERSONNEL DOOR TYPE: METAL

R-GLASS 1.61

SLF 0.67

R-BASEM. 0.00

R-PANEL 4.20

R-PDOOR 2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1682	X CFM / SQ.FT.	0.115	= 193
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	15		X CFM / OPENING / HR	1.385	= 21
TOTAL INFILTRATION (CFM)				=	214

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	1,568	X WALL 'U'	0.109	=	170
UA ROOF	= ROOF AREA	4,357	X ROOF 'U'	0.025	=	107
UA GLASS	= GLASS AREA	70	X GLASS 'U'	0.621	=	43
UA SLAB	= SLAB PERIM.	120	X SLF	0.670	=	80
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	214	X A. T. F.	1.035	=	222

**TOTAL UA (BTU/HR°F) 639**

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 16-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 1350BLZ4

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 1350 BLDG NAME: RESERVE CENTER

BLDG FUNCTION: ASSEMBLY HALL

FLOOR AREA: (SQ. FT)

2,232

# FLOORS 1

SLAB PERIMETER: (FT)

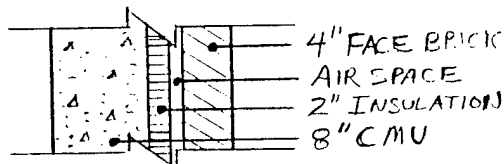
37

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	186	186	629	0	1,001
GLASS	(SQ. FT)	0	0	6	0	6
PERSONNEL DOOR	(SQ. FT)	0	0	42	0	42
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	186	186	581	0	953
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 2,232
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
PERSONNEL DOOR	(SQ. FT)	0	0	0	0	42
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

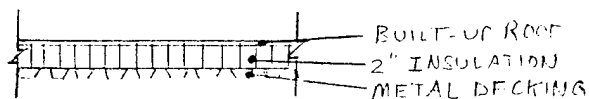
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. RIGID INSULATION	5.00
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.21
U=1/R	0.109

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. 2" RIGID INSULATION	6.68
4. AIR SPACE	1.00
5. BATT INSULATION	30.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	40.65
U=1/R	0.025

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:	NONE	R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1001	X CFM / SQ.FT.	0.115	= 115
LEAKY WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR		X CFM / OPENING /HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	25	X CFM / OPENING /HR	1.385	=	35
TOTAL INFILTRATION (CFM)				=	150

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	953	X WALL 'U'	0.109	=	103
UA ROOF	= ROOF AREA	2,232	X ROOF 'U'	0.025	=	55
UA GLASS	= GLASS AREA	6	X GLASS 'U'	0.621	=	4
UA SLAB	= SLAB PERIM.	37	X SLF	0.670	=	25
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	150	X A. T. F.	1.035	=	155

**TOTAL UA (BTU/HR°F) 358**

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 16-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 1350BLZ5

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 1350 BLDG NAME: RESERVE CENTER

BLDG FUNCTION: ADMINISTRATION

FLOOR AREA: (SQ. FT) 5,712

# FLOORS 1

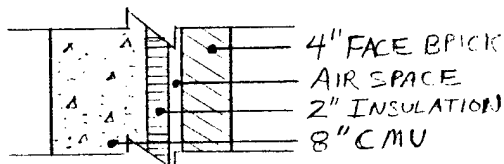
SLAB PERIMETER: (FT) 169

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	336	910	1,120	0	2,366
GLASS	(SQ. FT)	0	102	146	0	248
PERSONNEL DOOR	(SQ. FT)	0	21	21	0	42
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	336	787	953	0	2,076
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					5,712
INSULATED PANEL	(SQ. FT)	0				42
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. RIGID INSULATION	5.00
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.21
U=1/R	0.109

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. 2" RIGID INSULATION	6.68
4. AIR SPACE	1.00
5. BATT INSULATION	30.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	40.65
U=1/R	0.025

GLASS TYPE: DOUBLE PANE

R-GLASS 1.61

SLAB TYPE FLOOR: CONCRETE

SLF 0.67

BASEMENT TYPE: NONE

R-BASEM. 0.00

INSULATED PANEL: NONE

R-PANEL 4.20

PERSONNEL DOOR TYPE: METAL

R-PDOOR 2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	2366	X CFM / SQ.FT.	0.115	= 272
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	15	X CFM / OPENING /HR	1.600	=	24
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING /HR	1.385	=	0
		TOTAL INFILTRATION (CFM)		=	296

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	2,076	X WALL 'U'	0.109	=	225
UA ROOF	= ROOF AREA	5,712	X ROOF 'U'	0.025	=	141
UA GLASS	= GLASS AREA	248	X GLASS 'U'	0.621	=	154
UA SLAB	= SLAB PERIM.	169	X SLF	0.670	=	113
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	296	X A. T. F.	1.035	=	306

**TOTAL UA (BTU/HR°F) 956**

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 16-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1350Z1  
 BLDG: 1350 ZONE: 1

## **Rates of Heat Gain from Occupants of Conditioned Spaces**

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat (BTU/H)
1	4	7	Walking, 3mph, light machine work	Factory	375	625	1,500	2,500
TOTAL	4					TOTAL	1,500	2,500

## **Peak Wattage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	7	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	588
	6	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	1,008
TOTAL	13			TOTAL	1,596

## **Peak Value for Internal Gains**

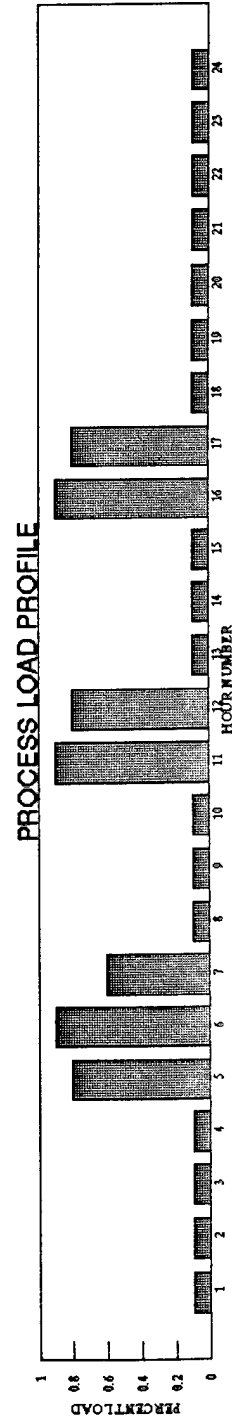
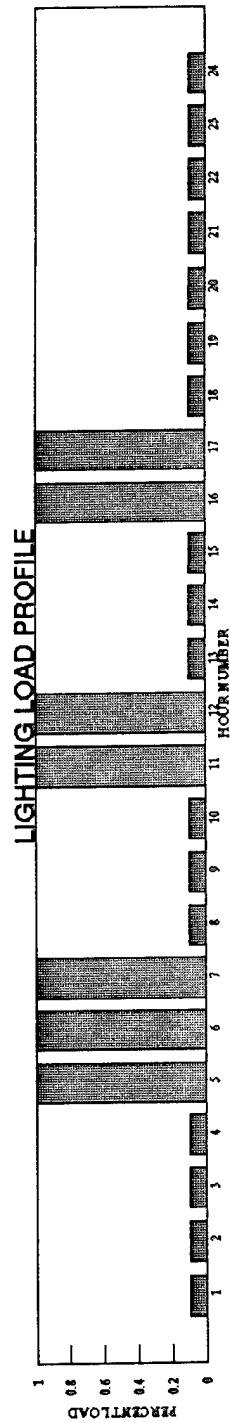
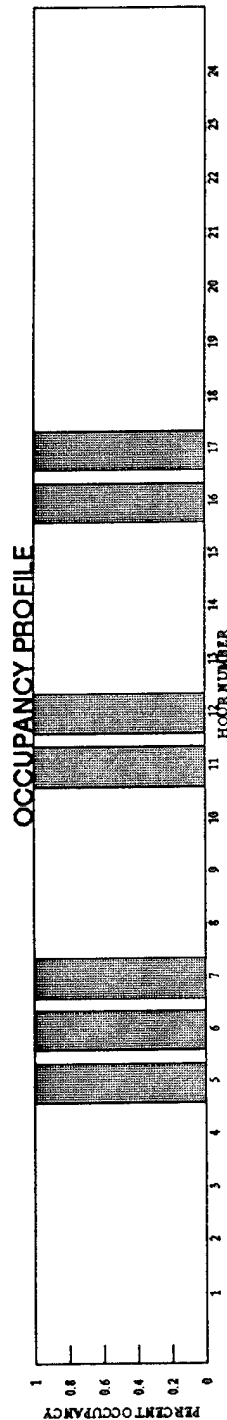
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
1	1	101	Dishwasher (hood type chemical sanitizing), per 100 dsh/hr	510	41%	510	1,741
	1	83	Freezer (large)	1,340	40%	1,340	4,573
	1	84	Griddle/grill (large) per sq.ft. of cooking surface (4.6 to 11.8)	2,696	10%	2,696	9,201
	1	87	Microwave oven (Heavy duty commercial)	2,628	100%	2,628	8,969
	1	81	Food Warmer (infrared bulb), per lamp	249	100%	249	850
	2	97	Oven (large convection), per cu.ft. of oven space	1,304		2,608	8,901
	1	77	Coffee brewing Um (large), per quart capacity	624	105%	624	2,130
	1	86	Ice maker	1,089	251%	1,089	3,717
	1	95	Fryer (deep fat), per lb. of fat capacity	372		372	1,270
	2	89	Refrigerator (large), per 100 cu.ft. of space	220	40%	440	1,502
TOTAL				TOTAL	59%	12,556	42,854

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 16-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1350Z1  
 BLDG: 1350  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	Kitchen	OCCUPANCY					1	1	1				1	1				1	1							
		LIGHTING	0.1	0.1	0.1	0.1	1	1	1	0.1	0.1	1	1	1	0.1	0.1	0.1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.8	0.9	0.6	0.1	0.1	0.1	0.9	0.8	0.1	0.1	0.1	0.9	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1



3204-000

16--Feb--93

TMB

**CEL**

**135072**

**1350**      **ZONE:**

# Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
2	3	7	Walking, 3mph, light machine work	Factory	375	625	1,125	1,875
TOTAL	3					TOTAL	1,125	1,875

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
2	57	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	4,768
	3	62	Exit Light	20	60
TOTAL	60			TOTAL	4,848

## Peak Value for Internal Gains

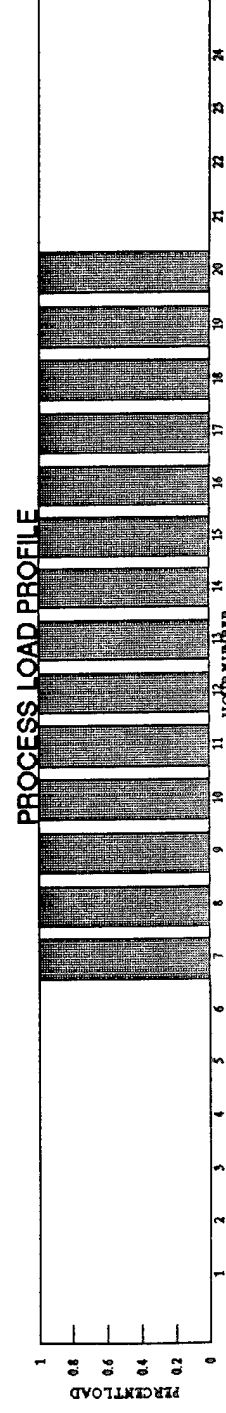
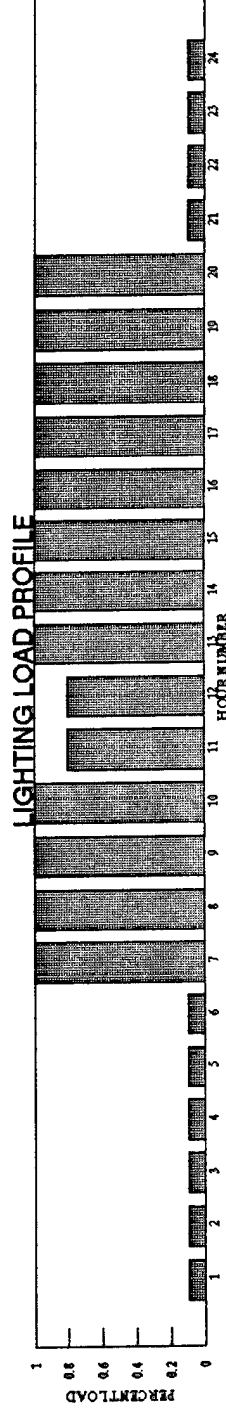
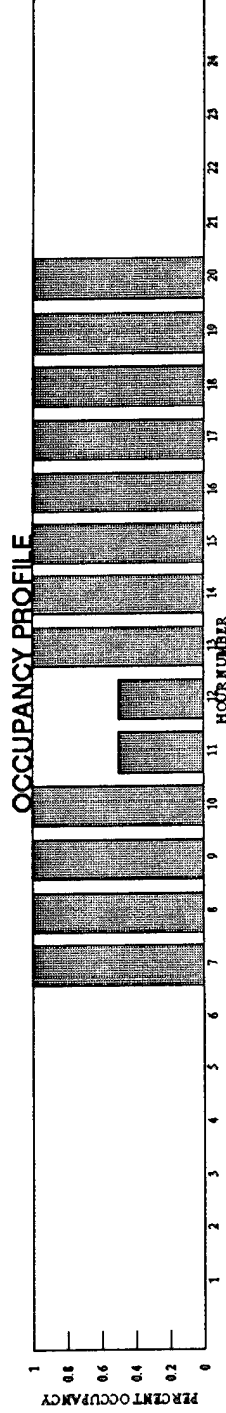
<b>Peak Value for Internal Gains</b>						
<b>Zone No.</b>	<b>No. of Equipment</b>	<b>Equip. Type</b>	<b>Description</b>	<b>Average Wattage</b>	<b>Heat Gain to Space(%)</b>	<b>Total BTU</b>
2	1	45	Micro Fiche Machine	250	50%	853
	1	10	Copy Machine	1,570	20%	5,358
			TOTAL		24%	6,212

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204 -000  
 DATE: 16 -Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1350Z2  
 BLDG: 1350  
 ZONE: 2

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY							1	1	1	1	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.8	1	1	1	1	1	1	1	1	0.1	0.1	0.1	0.1
		PROCESS							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



**EMC NO.:**

3204-000

17-Feb-93

PREPARED BY: TMB

**CHECKED BY:**

**FILE:** 1350Z3

**ZONE: 3**

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat (BTU/H)
3	48	2	Seated very light work (writing)	Offices, hotels, apts	245	155	11,760	7,440
TOTAL	48					TOTAL	11,760	7,440

**Peak Wattage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
3	13	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	1,092
	58	7	Fluorescent, 3 - 34w lamps, 16w ballast (2x4 ft. fixture)	118	6,844
TOTAL	71			TOTAL	7,936

## Peak Value for Internal Gains

Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
3	1	116	Pop Machine	321	35%	321	1,096
				TOTAL	35%	321	1,096

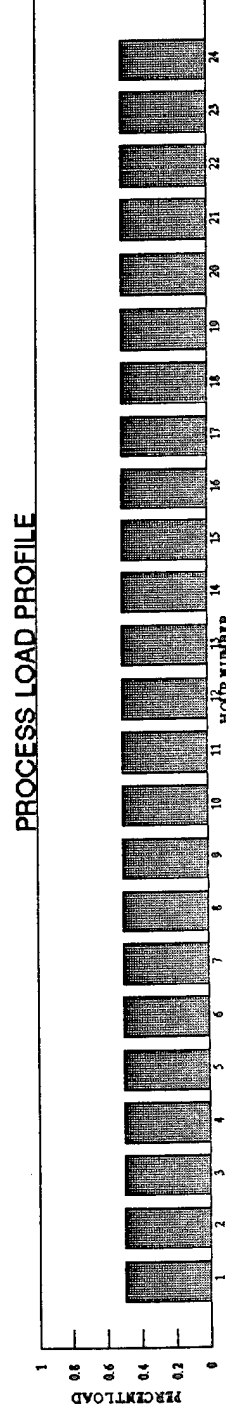
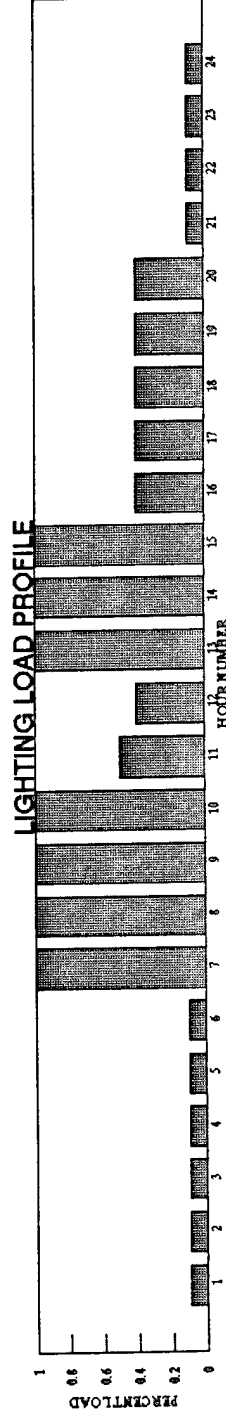
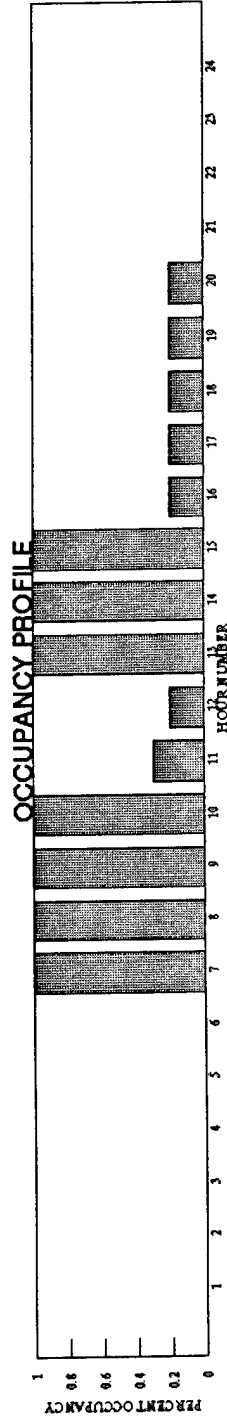


# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 17-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1350Z3  
 BLDG: 1350  
 ZONE: 3

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.3	0.2	1	1	1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
		PROCESS	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5



EMC NO.: 3204-000

DATE: 16-Feb-93

PREPARED BY: TMB

**CHECKED BY:**

**FILE:** 1350Z4

4

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
4	40	4	Seated, light work, typing	Offices, hotels, apts	250	200	10,000	8,000
TOTAL	40					TOTAL	10,000	8,000

## Peak Wattage Value for Lights

<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
4	2	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	168
	12	42	Metal Halide - 175w with 40w ballast	215	2 580
	3	62	Exit Light	20	60
TOTAL	17			TOTAL	2 808

### Peak Value for Internal Gains

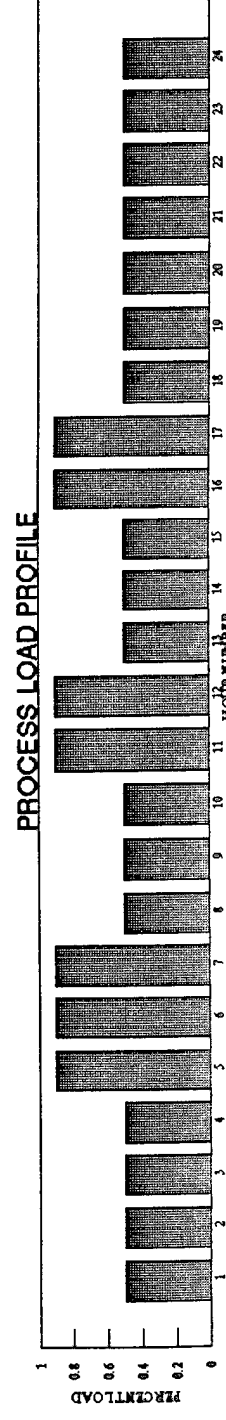
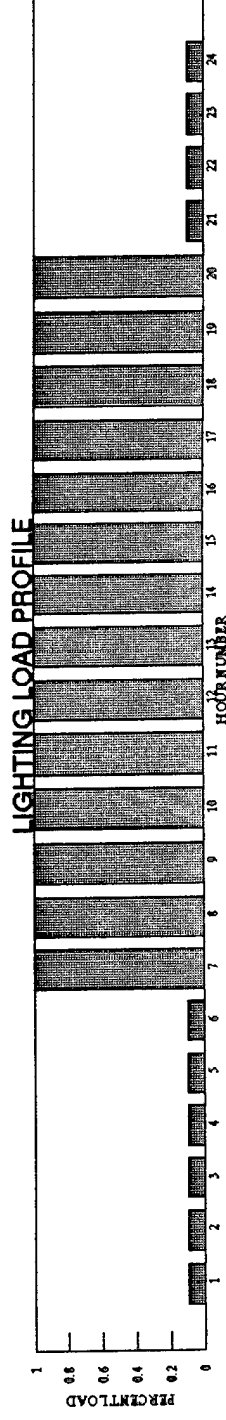
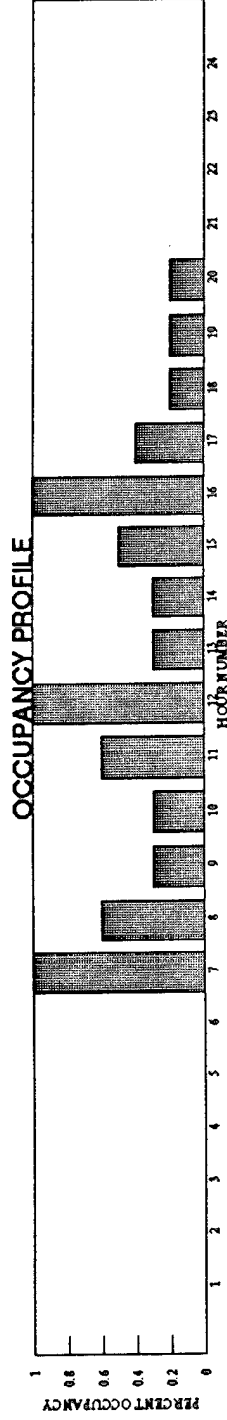
Zone No.	No. of Equipmen	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
4	3	116	Pop Machine	326	20%	978	3,338
	1	24	Coffee Maker	1,500	30%	1,500	5,120
	1	77	Coffee brewing Urn (large), per quart capacity	624	105%	624	2,130
				TOTAL	42%	3,102	10,587

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCs EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 16-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1350Z4  
 BLDG: 1350  
 ZONE: 4

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	0.4	0.2	0.2	0.2				
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.1	0.1	0.1
		PROCESS	0.5	0.5	0.5	0.5	0.9	0.9	0.9	0.5	0.5	0.5	0.9	0.9	0.5	0.5	0.5	0.9	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5



EMC NO.: 3204-000

16--Feb-93

PREPARED BY: TMB

**CHECKED BY:**

**1350 Z5**

**ZONE:** 5

### Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
5	50	4	Seated, light work, typing	Offices, hotels, apts	250	200	12,500	10,000
TOTAL	50					TOTAL	12,500	10,000

Peak Wattage Value for Lights
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<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
5	89	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	14,952
	1	62	Exit Light	20	20
TOTAL	90			TOTAL	14,972

### Peak Value for Internal Gains

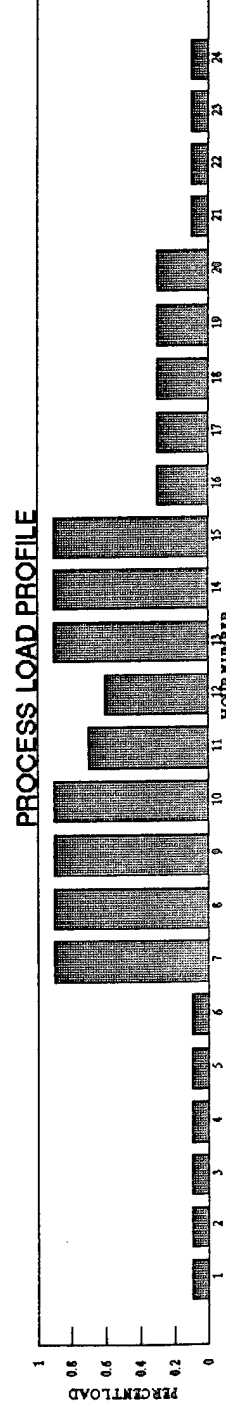
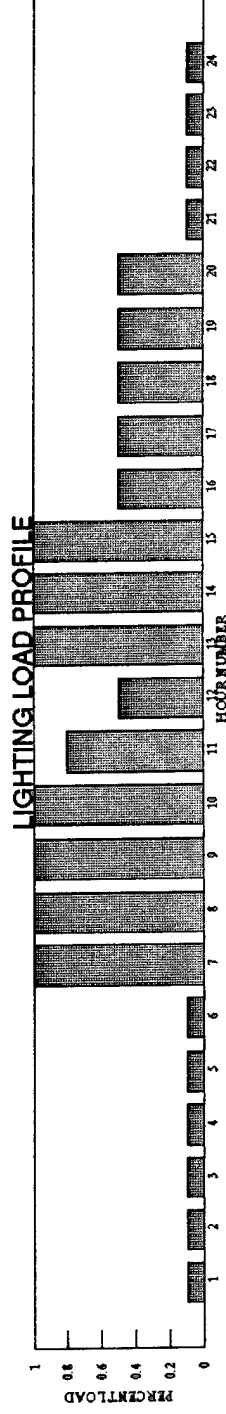
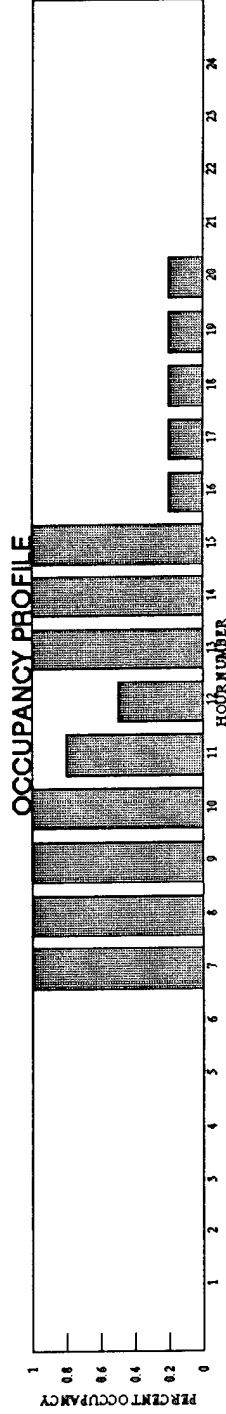
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# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204 -000  
 DATE: 16-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1350Z5  
 BLDG: 1350  
 ZONE: 5

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.5	1	1	1	0.2	0.2	0.2	0.2	0.2				
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.5	1	1	1	0.5	0.5	0.5	0.5	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.1	0.9	0.9	0.9	0.9	0.7	0.6	0.9	0.9	0.9	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1



## 01 Card - Job Information

Project: REAP STUDY, EXPANSION OF EMCS  
 Location: FT. LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: E M C ENGINEERS, INC.

## -----CARD 08-- Climatic Information-----

	Summer	Winter	Summer	Summer	Winter		Summer	Winter
Weather	Clearness	Clearness	Design	Design	Design	Building	Ground	Ground
Code	Number	Number	Dry Bulb	Wet Bulb	Dry Bulb	Orientation	Reflect	Reflect
SPRINGFM	.97	.97	94	78	3			

## -----CARD 09-- Load Simulation Periods-----

1st Month	Last Month	Peak	1st Month	Last Month	1st Month	Last Month
Cooling	Cooling	Cooling	Summer	Summer	Daylight	Daylight
Simulation	Simulation	Load Hr	Period	Period	Savings	Savings
MAY	SEP		JUN	SEP	APR	OCT

## -----CARD 10 -- Load Simulation Parameters-----

Cooling	Heating		Airflow	Airflow	Room	Put Wall
Load	Load	Ventilation	Input	Output	Circulation	RA Load
Method	Method	Method	Units	Units	Rate	to Room
TETD-TAI	TETD-TAI	OADB	ACTUAL	ACTUAL	MED-RCR	NO

## -----CARD 11-- Energy Simulation Parameters-----

1st Month	Last Month	Level			Building
Energy	Energy	Of	Holiday	Calendar	Floor
Simulation	Simulation	Calculation	Code	Code	Area
JAN	DEC	ROOM	1978	1978	17677

## ----- Load Section Alternative #1 -----

## ---- Load Alternative ----

Number	Description
1	BLDG 1350 BASERUN FT LEONARD WOOD

## -----CARD 20-- General Room Parameters -----

Room	Zone	Room	Floor	Floor	Const	Plenum	Acoustic	Floor to	Duplicate	Duplicate	Perimeter
Number	Reference	Descrip	Length	Width	Type	Height	Ceiling	Floor	Floors	Rooms per	Depth
	Number						Resistance	Height	Multiplier	Zone	
1	1	KITCHEN	36	18	2	0		17			
2	2	WAREHOUSE SUPPLY	131	36.092	2	0		14			
3	3	CLASSROOMS	67.031	65	2	0		14			
4	4	ASSEMBLY HALL	60.324	37	2	0		17			
5	5	ADMINISTRATION	87.877	65	2	0		14			

## -----CARD 21-- Thermostat Parameters -----

Room	Cooling	Room	Cooling	Cooling	Heating	Heating	Heating	T'stat	Mass /	Carpet
Number	Design DB	Design RH	T'stat	T'stat	Room	T'stat	T'stat	Location	No. Hrs	On
			Driftpoint	Schedule	Design DB	Driftpoint	Schedule	Flag	Average	Floor
M	75			CLG75SUM	70		BTG70WNT	ROOM	LIGHT30	NO
1										
2					67		BTG67WNT			
3										
4										
5										

## -----CARD 22-- Roof Parameters -----

Room	Roof	Roof	Roof	Roof	Roof	Const	Roof	Roof	Roof
Number	Number	Equal to	Length	Width	U-Value	Type	Direction	Tilt	Alpha
M	1				.025	50			.67
1	1	YES							
2	1	YES			.127				
3	1	YES							
4	1	YES							
5	1	YES							

## -----CARD 24-- Wall Parameters -----

Room	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Ground
Number	Number	Length	Height	U-Value	Constuc	Type	Direction	Tilt	Reflectance
M	1			.109	89				.68
1	1	10	5.7				0		
1	2	10	5.7				180		
1	3	65.1	10	.119			270		
2	1	187.6	10	.115			0		
2	2	67.2	10				180		
2	3	60.2	10	.129					
2	4	60.2	10	.129			270		
3	1	93.1	10	.115			180		
3	2	79.1	10	.116			270		

## -----CARD 24-- Wall Parameters -----

Room	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Ground
Number	Number	Length	Height	U-Value	Constuc	Type	Direction	Tilt	Alpha	Reflectance
4	1	18.6	10				0			
4	2	18.6	10				180			
4	3	67.1	10	.127			90			
5	1	33.6	10				0			
5	2	93.1	10	.115			180			
5	3	114.1	10	.114			90			

## -----CARD 25-- Wall/Glass Parameters -----

-----CARD 25----- Wall/Glass Parameters -----											
Room	Wall	Glass	Glass	Pct Glass			External	Internal	Percent		Inside
Number	Number	Length	Width	or No. of	Glass	Shading	Shading	Shading	Solar to	Visible	Visible
				Windows	U-Value	Coefficient	Type	Type	Ret. Air	Transmittance	Reflectance
M	1				.62	.58				.8	
1	3	3	2	1							
2	1	6	2	1							
2	3	6	2	1							
2	4	6	2	1							
3	1	11	5	1				3			
3	2	5	3	1							
4	3	3	2	1							
5	2	12.75	8	1				3			
5	3	18.25	8	1				3			

## -----CARD 26-- Schedules -----

Room	People	Lights	Ventilation	Infiltration	Reheat	Cooling	Heating	Auxiliary	Room	Daylighting
Number					Minimum	Fans	Fan	Fan	Exhaust	Controls
1	P-1350Z1	L-1350Z1	AVAIL	AVAIL		AVAIL	AVAIL			
2	P-1350Z2	L-1350Z2	AVAIL	AVAIL		AVAIL	AVAIL			
3	P-1350Z3	L-1350Z3	AVAIL	AVAIL		AVAIL	AVAIL			
4	P-1350Z4	L-1350Z4	AVAIL	AVAIL		AVAIL	AVAIL			
5	P-1350Z5	L-1350Z5	AVAIL	AVAIL		AVAIL	AVAIL			

## -----CARD 27-- People and Lights -----

-----CARD 27-- People and Lights -----											--- Daylighting ---	
Room	People	People	People	People	Lighting	Lighting	Lighting	Percent				
Number	Value	Units	Sensible	Latent	Value	Units	Fixture	Ballast	Lights to	Reference	Reference	
M		PEOPLE				WATTS	RECFL-NV		Ret. Air	Point 1	Point 2	
1	4		375	625	1596							
2	3		375	625	4848							
3	48		245	155	7936							
4	40		250	200	2808		INCAND					
5	50		250	200	14972							



## -----CARD 28--- Miscellaneous Equipment -----

Room	Misc Equipment Number	Equipment Descrip	Energy Consump Value	Energy Consump Units	Schedule Code	Energy Meter Code	Percent of Load Sensible	Percent Misc. Load to Room	Percent Misc. Sens to Ret. Air	Radiant Fraction	Optional Air Path SAME-RA
M	1	PROCESS EQUIP		WATTS		ELEC					
1	1		12556		E-1350Z1			5			
2	1		1820		E-1350Z2			24			
3	1		321		E-1350Z3			35			
4	1		3102		E-1350Z4			42			
5	1		11522		E-1350Z5			37			

## -----CARD 29--- Room Airflows -----

-----Ventilation-----					-----Infiltration-----					-----Reheat Minimum-----	
Room	-----Cooling-----		-----Heating-----		-----Cooling-----		-----Heating-----			Value	Units
Number	Value	Units	Value	Units	Value	Units	Value	Units			
M		CFM		CFM		CFM		CFM			
1			3036				90				
2							438				
3	600		600		214		214				
4			660				150				
5	380		380		296		296				

## -----CARD 30- Fan Airflows -----

-----Main-----					-----Auxiliary-----				-----Room Exhaust-----	
Room	-----Cooling-----		-----Heating-----		-----Cooling-----		-----Heating-----		Value	Units
Number	Value	Units	Value	Units	Value	Units	Value	Units		
M		CFM		CFM						
1	0		4686							
2	0		1480							
3	3080		3080							
4	0		3720							
5	3800		3800							

## -----CARD 31-- Partition Parameters -----

Room	Partition	Partition	Partition	Partition	Const	Temp	Cooling	Heating	Adjacent
Number	Number	Length	Height	U-Value	Type	Flag	Temp	Temp	Room No
M	1				101	CONSTANT			
2	1	100	57						
3	1	100	75.2						
4	1	100	16.1						
5	1	100	104.9						

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1

BLDG 1350 BASERUN FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC On Peak (kWh)	DEMAND On Peak (kW)	GAS On Peak (Therm)	GAS DMND On Peak (Thrm/hr)
Jan	26,896	68	1,360	3
Feb	24,306	68	1,254	3
March	27,659	68	967	3
April	25,190	68	257	1
May	25,059	69	0	0
June	26,135	73	0	0
July	27,253	75	0	0
Aug	27,290	73	0	0
Sept	24,024	70	0	0
Oct	26,703	68	378	1
Nov	25,906	68	613	2
Dec	26,515	68	1,280	3
Total	312,936	75	6,109	3

Building Energy Consumption = 94,977 (Btu/Sq Ft/Year)  
Source Energy Consumption = 217,655 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref	Equip Num Code	----- Monthly Consumption -----												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													
	ELEC	7678	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	90,948
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1170S													
	ELEC	0	0	0	0	712	1253	1866	1384	805	0	0	0	6,019
	PK	0.0	0.0	0.0	0.0	5.3	6.9	8.1	6.9	5.6	0.0	0.0	0.0	8.1
1	EQ5200													
	ELEC	0	0	0	0	96	172	252	188	108	0	0	0	816
	PK	0.0	0.0	0.0	0.0	0.8	1.0	1.1	0.9	0.8	0.0	0.0	0.0	1.1
1	EQ5313													
	ELEC	0	0	0	0	114	125	195	158	99	0	0	0	691
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1170S													
	ELEC	0	0	0	0	1783	2537	3091	2652	1854	0	0	0	11,917
	PK	0.0	0.0	0.0	0.0	8.9	10.8	12.0	10.8	9.3	0.0	0.0	0.0	12.0
2	EQ5200													
	ELEC	0	0	0	0	228	341	413	355	239	0	0	0	1,576

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	1.3	1.5	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2 EQ5313	CONTROLS												881
ELEC	0	0	0	0	150	169	223	195	144	0	0	0	0.3
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
1 EQ4003	FC CENTRIF. FAN C.V.												11,387
ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	2.2	2.2	2.2	
1 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2 EQ4381	PROPELLER FAN												1,638
ELEC	139	126	139	135	139	135	139	139	135	139	135	139	0.2
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
2 EQ4381	PROPELLER FAN												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3 EQ4003	FC CENTRIF. FAN C.V.												19,605
ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
3 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4 EQ4003	FC CENTRIF. FAN C.V.												11,387
ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	
4 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5 EQ4003	FC CENTRIF. FAN C.V.												32,675
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	3.7
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
5 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1 EQ2001	GAS FIRE TUBE HOT WATER												6,109
GAS	1360	1254	967	257	0	0	0	0	0	378	613	1280	3.4
PK	3.4	3.2	2.6	0.9	0.0	0.0	0.0	0.0	0.0	1.2	1.7	2.8	
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												6,865
ELEC	1110	1003	1110	671	0	0	0	0	0	786	1074	1110	1.5
PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BLDG 1350 BASERUN FT LEONARD WOOD

1	EQ5240	BOILER FORCED DRAFT FAN												
	ELEC	490	442	490	296	0	0	0	0	0	347	474	490	3,027
	PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
1	EQ5307	BOILER CONTROLS												
	ELEC	372	336	372	225	0	0	0	0	0	263	360	372	2,301
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 1350 NIGHT SETBACK FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	26,814	68	1,019	6
Feb	24,232	68	963	6
March	27,495	68	728	5
April	24,634	68	148	2
May	26,596	69	0	0
June	26,032	73	0	0
July	26,357	75	0	0
Aug	26,962	73	0	0
Sept	24,370	70	0	0
Oct	26,210	68	228	2
Nov	25,667	68	406	3
Dec	26,433	68	983	5
Total	311,801	75	4,474	6

Building Energy Consumption = 85,513 (Btu/Sq Ft/Year)  
Source Energy Consumption = 207,266 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 1350 NIGHT SETBACK FT LEONARD WOOD

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	----- Monthly Consumption -----												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													
	ELEC	7678	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	90,948
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	573	1117	1540	1197	723	0	0	0	5,150
	PK	0.0	0.0	0.0	0.0	5.3	6.9	8.1	6.9	5.6	0.0	0.0	0.0	8.1
1	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	77	151	206	160	96	0	0	0	689
	PK	0.0	0.0	0.0	0.0	0.8	1.0	1.1	0.9	0.8	0.0	0.0	0.0	1.1
1	EQ5313													
		CONTROLS												
	ELEC	0	0	0	0	82	101	118	109	80	0	0	0	490
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	1501	2218	2574	2311	1643	0	0	0	10,248
	PK	0.0	0.0	0.0	0.0	8.9	10.8	12.0	10.8	9.3	0.0	0.0	0.0	12.0
2	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	189	293	341	305	208	0	0	0	1,337

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 1350 NIGHT SETBACK FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	1.3	1.5	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2 EQ5313	CONTROLS												
ELEC	0	0	0	0	115	117	121	121	107	0	0	0	581
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	1318	0	-0	0	0	1665	1611	1665	12,705
PK	2.2	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	2.2	2.2	2.2	2.2
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ4381	PROPELLER FAN												
ELEC	139	126	139	135	139	135	139	139	135	139	135	139	1,638
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2 EQ4381	PROPELLER FAN												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	19,605
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	763	497	244	401	739	1665	1611	1665	14,030
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	32,675
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
5 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 EQ2001	GAS FIRE TUBE HOT WATER												
GAS	1019	963	728	148	0	0	0	0	0	228	406	983	4,474
PK	6.1	5.9	4.9	1.6	0.0	0.0	0.0	0.0	0.0	1.6	2.7	4.7	6.1
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	1064	961	1018	358	0	0	0	0	0	509	940	1064	5,913
PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	1.5



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 BLDG 1350 NIGHT SETBACK FT LEONARD WOOD

1	EQ5240	BOILER FORCED DRAFT FAN												
	ELEC	469	424	449	158	0	0	0	0	0	224	415	469	2,608
	PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
1	EQ5307	BOILER CONTROLS												
	ELEC	356	322	341	120	0	0	0	0	0	170	315	356	1,981
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 1350 DDC CONTROL FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	26,814	68	837	5
Feb	24,232	68	790	4
March	27,495	68	583	3
April	24,634	68	128	1
May	26,296	70	0	0
June	25,302	72	0	0
July	25,608	75	0	0
Aug	26,145	72	0	0
Sept	23,523	69	0	0
Oct	26,210	68	203	1
Nov	25,588	68	345	2
Dec	26,433	68	852	3
Total	308,280	75	3,738	5

Building Energy Consumption = 80,668 (Btu/Sq Ft/Year)  
Source Energy Consumption = 200,841 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 1350 DDC CONTROL FT LEONARD WOOD

----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													
	ELEC	7678	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	90,948
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	436	919	1271	978	578	0	0	0	4,182
	PK	0.0	0.0	0.0	0.0	4.6	6.4	7.5	6.4	5.1	0.0	0.0	0.0	7.5
1	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	59	125	170	131	77	0	0	0	562
	PK	0.0	0.0	0.0	0.0	0.7	0.9	1.0	0.9	0.7	0.0	0.0	0.0	1.0
1	EQ5313													
		CONTROLS												
	ELEC	0	0	0	0	71	86	108	97	72	0	0	0	434
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	1332	2047	2406	2143	1471	0	0	0	9,399
	PK	0.0	0.0	0.0	0.0	8.6	10.2	12.0	10.8	9.0	0.0	0.0	0.0	12.0
2	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	170	272	320	284	189	0	0	0	1,235

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 1350 DDC CONTROL FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	1.2	1.4	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2 EQ5313	CONTROLS												
ELEC	0	0	0	0	101	112	121	118	93	0	0	0	546
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	1388	0	0	0	0	1665	1611	1665	12,774
PK	2.2	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	2.2	2.2	2.2	2.2
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ4381	PROPELLER FAN												
ELEC	139	126	139	135	139	135	139	139	135	139	135	139	1,638
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2 EQ4381	PROPELLER FAN												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	19,605
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	763	201	0	36	269	1665	1611	1665	12,656
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	32,675
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
5 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 EQ2001	GAS FIRE TUBE HOT WATER												
GAS	837	790	583	128	0	0	0	0	0	203	345	852	3,738
PK	4.7	3.9	2.8	1.1	0.0	0.0	0.0	0.0	0.0	1.3	1.9	3.1	4.7
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	1064	961	1018	358	0	0	0	0	0	509	895	1064	5,868
PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	1.5

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 1350 DDC CONTROL FT LEONARD WOOD

1	EQ5240	BOILER FORCED DRAFT FAN												
	ELEC	469	424	449	158	0	0	0	0	0	224	395	469	2,588
	PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
1	EQ5307	BOILER CONTROLS												
	ELEC	356	322	341	120	0	0	0	0	0	170	300	356	1,967
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 1350 ECONOMIZER FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC On Peak (kWh)	DEMAND On Peak (kW)	GAS On Peak (Therm)	GAS DMND On Peak (Thrm/hr)
Jan	26,814	68	837	5
Feb	24,232	68	790	4
March	27,495	68	583	3
April	24,634	68	128	1
May	26,276	70	0	0
June	25,300	72	0	0
July	25,602	75	0	0
Aug	26,104	72	0	0
Sept	23,478	69	0	0
Oct	26,210	68	203	1
Nov	25,588	68	345	2
Dec	26,433	68	852	3
Total	308,165	75	3,738	5

Building Energy Consumption = 80,645 (Btu/Sq Ft/Year)  
Source Energy Consumption = 200,775 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 1350 ECONOMIZER FT LEONARD WOOD

----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N -----

Ref Num	Equip Code	----- Monthly Consumption -----												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													
	ELEC	7678	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	90,948
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	422	886	1256	954	537	0	0	0	4,055
	PK	0.0	0.0	0.0	0.0	4.6	6.4	7.5	6.4	5.1	0.0	0.0	0.0	7.5
1	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	58	121	168	129	73	0	0	0	549
	PK	0.0	0.0	0.0	0.0	0.7	0.9	1.0	0.9	0.7	0.0	0.0	0.0	1.0
1	EQ5313													
		CONTROLS												
	ELEC	0	0	0	0	71	86	108	97	72	0	0	0	434
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	1327	2079	2415	2129	1470	0	0	0	9,421
	PK	0.0	0.0	0.0	0.0	8.6	10.2	12.0	10.8	9.0	0.0	0.0	0.0	12.0
2	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	169	276	321	283	189	0	0	0	1,238

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 1350 ECONOMIZER FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	1.2	1.4	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2 EQ5313	CONTROLS												546
ELEC	0	0	0	0	101	112	121	118	93	0	0	0	0.3
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
1 EQ4003	FC CENTRIF. FAN C.V.												12,774
ELEC	1665	1504	1665	1611	1388	0	0	0	0	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	2.2	2.2	2.2	
1 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2 EQ4381	PROPELLER FAN												1,638
ELEC	139	126	139	135	139	135	139	139	135	139	135	139	0.2
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
2 EQ4381	PROPELLER FAN												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3 EQ4003	FC CENTRIF. FAN C.V.												19,605
ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
3 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4 EQ4003	FC CENTRIF. FAN C.V.												12,656
ELEC	1665	1504	1665	1611	763	201	0	36	269	1665	1611	1665	2.2
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
4 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5 EQ4003	FC CENTRIF. FAN C.V.												32,675
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	3.7
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
5 EQ4003	FC CENTRIF. FAN C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1 EQ2001	GAS FIRE TUBE HOT WATER												3,738
GAS	837	790	583	128	0	0	0	0	0	203	345	852	4.7
PK	4.7	3.9	2.8	1.1	0.0	0.0	0.0	0.0	0.0	1.3	1.9	3.1	
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												5,868
ELEC	1064	961	1018	358	0	0	0	0	0	509	895	1064	1.5
PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	



1	EQ5240	BOILER FORCED DRAFT FAN												
	ELEC	469	424	449	158	0	0	0	0	0	224	395	469	2,588
	PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
1	EQ5307	BOILER CONTROLS												
	ELEC	356	322	341	120	0	0	0	0	0	170	300	356	1,967
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 OA NIGHTIME FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	25,958	68	141	1
Feb	23,556	68	127	1
March	26,258	68	60	0
April	23,406	65	5	0
May	25,209	69	0	0
June	26,273	73	0	0
July	26,915	75	0	0
Aug	27,336	73	0	0
Sept	24,249	70	0	0
Oct	24,563	65	2	0
Nov	23,951	65	0	0
Dec	24,676	65	12	0
Total	302,349	75	346	1

Building Energy Consumption = 60,334 (Btu/Sq Ft/Year)  
Source Energy Consumption = 177,207 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 OA NIGHTIME FT LEONARD WOOD

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													
	ELEC	7678	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	90,948
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	740	1303	1722	1399	875	0	0	0	6,039
	PK	0.0	0.0	0.0	0.0	5.3	6.9	8.1	6.9	5.6	0.0	0.0	0.0	8.1
1	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	97	174	231	186	114	0	0	0	803
	PK	0.0	0.0	0.0	0.0	0.8	1.0	1.1	0.9	0.8	0.0	0.0	0.0	1.1
1	EQ5313													
		CONTROLS												
	ELEC	0	0	0	0	158	188	223	207	153	0	0	0	929
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	1809	2519	2914	2615	1912	0	0	0	11,769
	PK	0.0	0.0	0.0	0.0	8.9	10.8	12.0	10.8	9.3	0.0	0.0	0.0	12.0
2	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	227	334	388	348	242	0	0	0	1,540

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 1350 OA NIGHTIME FT LEONARD WOOD

	PK	0.0	0.0	0.0	0.0	1.3	1.5	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2	EQ5313	CONTROLS												
	ELEC	0	0	0	0	202	216	223	223	177	0	0	0	1,041
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	1665	1504	1665	940	0	0	0	0	0	895	1564	1665	9,899
	PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	2.2
1	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ4381	PROPELLER FAN												
	ELEC	139	126	139	135	139	135	139	139	135	139	135	139	1,638
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2	EQ4381	PROPELLER FAN												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	19,605
	PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
3	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	11,387
	PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	2.2
4	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	32,675
	PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
5	EQ4003	FC CENTRIF. FAN C.V.												
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ2001	GAS FIRE TUBE HOT WATER												
	GAS	141	127	60	5	0	0	0	0	0	2	0	12	346
	PK	0.7	0.7	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.7
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												
	ELEC	582	580	321	45	0	0	0	0	0	15	0	75	1,617
	PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	0.0	1.5	1.5

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BLDG 1350 OA NIGHTTIME FT LEONARD WOOD

BOILER FORCED DRAFT FAN													
1 EQ5240													
ELEC	257	256	141	20	0	0	0	0	0	7	0	33	713
PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.7	0.7
BOILER CONTROLS													
1 EQ5307													
ELEC	195	194	108	15	0	0	0	0	0	5	0	25	542
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.5	0.5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 1350 OA DAYTIME FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	25,958	68	206	1
Feb	23,532	68	174	1
March	26,308	68	88	1
April	23,406	65	5	0
May	25,085	67	0	0
June	25,755	70	0	0
July	26,342	71	0	0
Aug	26,886	69	0	0
Sept	23,984	67	0	0
Oct	24,563	65	2	0
Nov	24,009	65	6	0
Dec	25,134	65	66	0
Total	300,963	71	548	1

Building Energy Consumption = 61,207 (Btu/Sq Ft/Year)  
Source Energy Consumption = 177,605 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 1350 OA DAYTIME FT LEONARD WOOD

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	9337	8442	9872	8950	9604	9484	9070	9872	8950	9604	8950	9070	111,203
	PK	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2	32.2
1	MISC LD													
	ELEC	7878	6939	7907	7394	7793	7622	7564	7907	7394	7793	7394	7564	90,948
	PK	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	702	1090	1544	1222	761	0	0	0	5,318
	PK	0.0	0.0	0.0	0.0	4.5	5.0	5.6	5.1	4.6	0.0	0.0	0.0	5.6
1	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	93	147	206	163	100	0	0	0	710
	PK	0.0	0.0	0.0	0.0	0.6	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.7
1	EQ5313													
		CONTROLS												
	ELEC	0	0	0	0	123	125	195	158	108	0	0	0	710
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1170S													
		AIR-CLD COND COMP <20 TONS												
	ELEC	0	0	0	0	1766	2331	2615	2439	1833	0	0	0	10,984
	PK	0.0	0.0	0.0	0.0	8.1	9.2	10.0	9.3	8.4	0.0	0.0	0.0	10.0
2	EQ5200													
		CONDENSER FANS												
	ELEC	0	0	0	0	220	308	347	322	230	0	0	0	1,427

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 1350 OA DAYTIME FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	1.2	1.3	1.3	1.3	1.2	0.0	0.0	0.0	1.3
2 EQ5313	CONTROLS												
ELEC	0	0	0	0	205	216	223	223	177	0	0	0	1,044
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	940	0	0	0	0	0	895	1564	1665	9,899
PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	2.2
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ4381	PROPELLER FAN												
ELEC	139	126	139	135	139	135	139	139	135	139	135	139	1,638
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2 EQ4381	PROPELLER FAN												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	19,605
PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	11,387
PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	2.2
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	32,675
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
5 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 EQ2001	GAS FIRE TUBE HOT WATER												
GAS	206	174	88	5	0	0	0	0	0	2	6	66	548
PK	1.1	0.8	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3	1.1
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	582	567	349	45	0	0	0	0	0	15	33	333	1,923
PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	1.5



1	EQ5240	BOILER FORCED DRAFT FAN											848	
	ELEC	257	250	154	20	0	0	0	0	0	7	14	147	0.7
	PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
1	EQ5307	BOILER CONTROLS											645	
	ELEC	195	190	117	15	0	0	0	0	0	5	11	111	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

**COMPUTER SIMULATIONS**

BUILDING 1720

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 1720  
BLDG. TYPE: BARRACKS

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	1070.3	1024.2	980.2			
COOLING (kWH)	40300	39310	36970			

SUPPLY AIR FAN	37800 CFM
FLOOR AREA	22876 FT <sup>2</sup>
CFMI	1348 CFM
UA	5819 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	0	2400	120 HR	HR. ON HEATING	4368 HR/YR
SAT.	0	2400	24 HR	HR. ON COOLING	2928 HR/YR
SUN.	0	2400	24 HR	HR. OFF HEATING	0 HR/YR
	TOTAL OCCUPY HR.		168 HR/WK	HR. OFF COOLING	0 HR/YR
	TOTAL UNOCC. HR.		0 HR/WK		
	ANNUAL OCCUPY HR.		8760 HR/YR		
	ANNUAL UNOCC. HR.		0 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 4368 = 0 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 2928 = 0 HR/YR

HOAUHC	1070.3 MBtu	-	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1348 CFM	*	0 HR/YR		
HOAUH	1070.3 MBtu	-	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1348 CFM	*	0 HR/YR		
COAUHC	40300 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	1348 CFM	*	0 HR/YR		
COAUC	40300 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	1348 CFM	*	0 HR/YR		
HOAOHC	1070.3 MBtu	-	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1348 CFM	*	8760 HR/YR		
HOAOH	1070.3 MBtu	-	0 MBtu	=	0.00E+00 Btu/CFM-HR
	1348 CFM	*	4368 HR/YR		
COAOHC	40300 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	1348 CFM	*	8760 HR/YR		
COAOC	40300 kWH	-	0 kWH	=	0.00E+00 kWH/CFM-HR
	1348 CFM	*	2928 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				=	0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 1720  
BLDG. TYPE: BARRACKS

**ENERGY CONSTANT CALCULATIONS**

ECC	36970 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	37800 CFM *	2928 HR/YR		
ECHC	36970 KWH -	0 KWH	=	0.00E+00 KWH/CFM-HR
	37800 CFM *	8760 HR/YR		
NSUCHC	40300 KWH -	39310 KWH	=	0.00E+00 KWH/CFM-HR
	37800 CFM *	0 HR/YR		
NSUCC	40300 KWH -	39310 KWH	=	0.00E+00 KWH/CFM-HR
	37800 CFM *	0 HR/YR		
DDCCHC	39310 KWH -	36970 KWH	=	7.07E-06 KWH/CFM-HR
	37800 CFM *	8760 HR/YR		
DDCCC	39310 KWH -	36970 KWH	=	2.11E-05 KWH/CFM-HR
	37800 CFM *	2928 HR/YR		
NSC	1070.3 MBtu -	1024.22 MBtu	=	7.92E+03 Btu/UA
		5819 UA		
DSC	1024.22 MBtu -	980.18 MBtu	=	7.57E+03 Btu/UA
		5819 UA		
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	0 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG.: DOUG CAGE  
 LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93  
 BY: TMB  
 JOB: 3204.000  
 CHK: AJN  
 FILE: 1720BHL

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 1720 BLDG NAME: EM BARRACKS

BLDG FUNCTION: BARRACKS

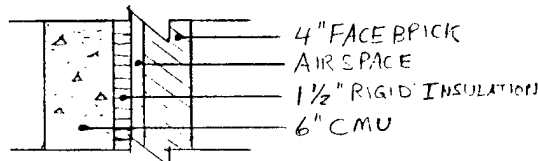
FLOOR AREA: (SQ. FT) 22,876

# FLOORS 3

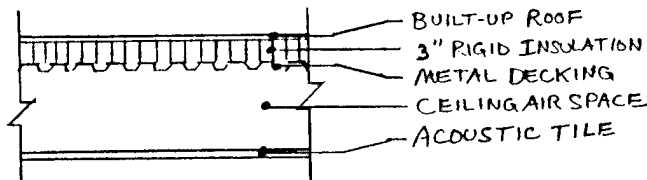
SLAB PERIMETER: (FT) 600

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	4,236	4,236	5,343	5,171	18,986
GLASS	(SQ. FT)	0	0	1,179	1,148	2,327
PERSONNEL DOOR	(SQ. FT)	0	0	126	126	252
INSULATED PANEL	(SQ. FT)	0	0	888	864	1,752
WALLS, NET	(SQ. FT)	4,236	4,236	3,150	3,033	14,655
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					7,721
INSULATED PANEL	(SQ. FT)	1,752				
PERSONNEL DOOR	(SQ. FT)					252
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 1.5" RIGID INSULATION	4.98
5. 6" CONCRETE BLOCK	1.89
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.06
U=1/R	0.110

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 3" INSULATION	10.03
4. CEILING AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.01
U=1/R	0.071

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.49
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:		R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)	M	18986	X CFM / SQ.FT.	0.069	=	1,310
AVG. WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR	24		X CFM / OPENING / HR	1.600	=	38
DOOR OPENINGS / HR - DOUBLE DOORS			X CFM / OPENING / HR	1.385	=	0
			TOTAL INFILTRATION (CFM)		=	1348

UA PANEL	= PANEL AREA	1,752	X PANEL 'U'	0.238	=	417
UA PDOOR	= PDOOR AREA	252	X DOOR 'U'	0.391	=	98
UA WALL	= WALL AREA	14,655	X WALL 'U'	0.110	=	1,617
UA ROOF	= ROOF AREA	7,721	X ROOF 'U'	0.071	=	551
UA GLASS	= GLASS AREA	2,327	X GLASS 'U'	0.621	=	1,445
UA SLAB	= SLAB PERIM.	600	X SLF	0.490	=	294
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	1348	X A. T. F.	1.035	=	1,396
			TOTAL UA (BTU/HR°F)			5,819

**EMC NO.:**

**PROJECT: EEAP: EMCS EXPANSION FEASIBILITY STUDY**

04-Feb-93

DATE: \_\_\_\_\_

**PREPARED BY:**

**TMB**

**CHECKED BY:**

**CEL**

3113

1720Z1

**BUDG:**

1720

1

## Bates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat. (BTU/H)
1	96	1 Seated at rest		Theater, Movie	225	105	21,600	10,080
TOTAL	96					TOTAL	21,600	10,080

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	3	17	Incandescent - 40w	40	120
	192	18	Incandescent - 60w	60	11,520
	24	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	2,016
	48	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	2,400
TOTAL	267			TOTAL	16,056

## Peak Value for Internal Gains

Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
1	96	50	Rado/Record Player	109	15%	10,464	35,714
	48	53	Refrigerator (small)	138	20%	6,624	22,608
	48	31	Fan (Circulating)	88	20%	4,224	14,417
				TOTAL	18%	21,312	72,738

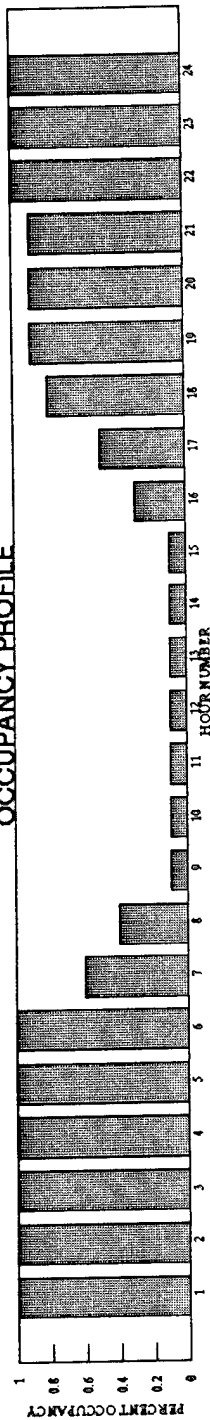
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

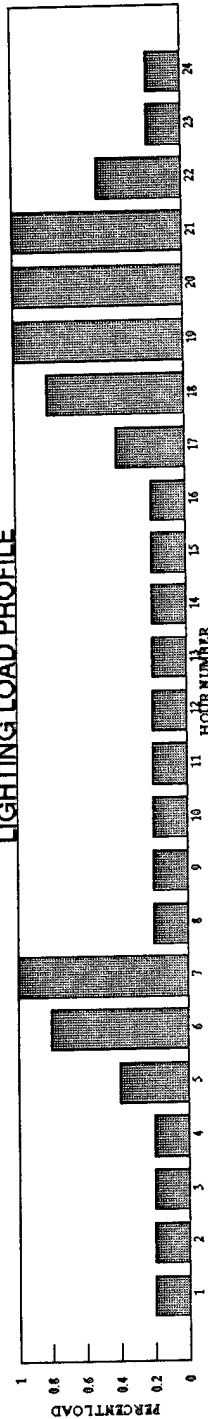
EMC NO.: 3204 -000  
 DATE: 04 -Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 1720Z1  
 BLDG: 1720  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Barracks	OCCUPANCY	1	1	1	1	1	1	0.6	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5	0.8	0.9	0.9	1	1	1	1
		LIGHTING	0.2	0.2	0.2	0.2	0.4	0.8	1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.8	1	1	1	0.5	0.2	0.2
		PROCESS	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.6	0.7	0.9	0.9	0.9	0.5	0.3	0.3

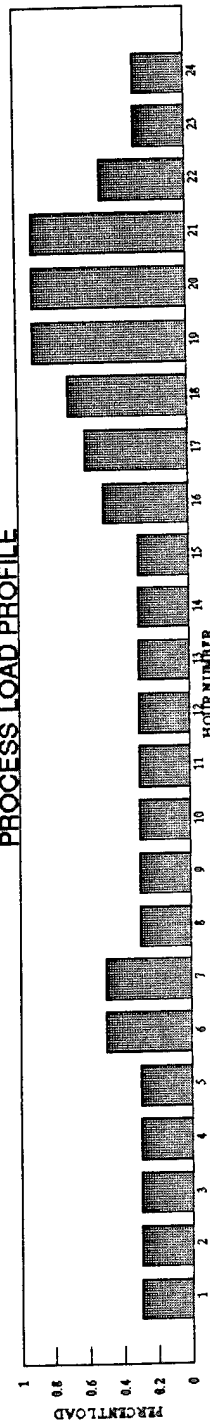
**OCCUPANCY PROFILE**



**LIGHTING LOAD PROFILE**



**PROCESS LOAD PROFILE**



BLDG 1720 - E.M. BARRACKS BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 1.000000  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 8.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 2.900000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 190625.000000

FLOOR AREA (SQFT) 22876.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 620930.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -725350.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 228760.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 1348.000000

## INFILTRATION PROFILE

.800	.800	.800	.800	.800	.800	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	.800	.800	.800

A FACTOR IN INFILTRATION EQUATION (CINA) 4.240000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 23702.360000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 294.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 98.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	4236.0	4069.0	4236.0	4038.0
WINDOW AREA SQFT (AWND)	.0	1148.0	.0	1179.0
WINDOW HEIGHT FT (WNDH)	.0	10.0	.0	10.0
WINDOW WIDTH FT (WNDW)	.0	114.8	.0	117.9
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.137	.110	.138
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00405	.00505	.00405	.00508
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00001	.00001	.00001	.00001
N=2	.00056	.00070	.00056	.00071
N=3	.00223	.00278	.00223	.00280
N=4	.00116	.00144	.00116	.00145
N=5	.00009	.00011	.00009	.00011
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.71940	-1.71940	-1.71940	-1.71940
N=3	.84375	.84375	.84375	.84375
N=4	-.09022	-.09022	-.09022	-.09022
N=5	.00268	.00268	.00268	.00268
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7721.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	3.441956E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.193E-02 .199E-01 .120E-01 .540E-03	771.	771.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.800000E-01		

-----INTERNAL GAINS AND PROFILES-----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	BTU/HR - - - - -		HEATING	COOLING
				PEOPLE SENSIBLE	PEOPLE LATENT		
		16.	13093.	21600.	10080.		
		HOURLY FRACTION OF PEAK - - - - -					
1		.200	.300	1.000	1.000	70.0	75.0
2		.200	.300	1.000	1.000	70.0	75.0
3		.200	.300	1.000	1.000	70.0	75.0
4		.200	.300	1.000	1.000	70.0	75.0
5		.400	.300	1.000	1.000	70.0	75.0
6		.800	.500	1.000	1.000	70.0	75.0
7	1.000	.500	.600	.600	.600	70.0	75.0
8	.200	.300	.400	.400	.400	70.0	75.0
9	.200	.300	.100	.100	.100	70.0	75.0
10	.200	.300	.100	.100	.100	70.0	75.0
11	.200	.300	.100	.100	.100	70.0	75.0
12	.200	.300	.100	.100	.100	70.0	75.0

13	.200	.300	.100	.100	70.0	75.0
14	.200	.300	.100	.100	70.0	75.0
15	.200	.300	.100	.100	70.0	75.0
16	.200	.500	.300	.300	70.0	75.0
17	.400	.600	.500	.500	70.0	75.0
18	.800	.700	.800	.800	70.0	75.0
19	1.000	.900	.900	.900	70.0	75.0
20	1.000	.900	.900	.900	70.0	75.0
21	1.000	.900	.900	.900	70.0	75.0
22	.500	.500	1.000	1.000	70.0	75.0
23	.200	.300	1.000	1.000	70.0	75.0
24	.200	.300	1.000	1.000	70.0	75.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					37800.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.250000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					620930.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					776162.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					725350.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					134096.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 1720 - E.M. BARRACKS    BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0.	GAIN	33.	0.	0.	0.	0.	0.	0.	0.
	-169.	LOSS		-16.	-10.	0.	-40.	-32.	-137.	0.
FEB	0.	GAIN	44.	0.	0.	0.	0.	0.	0.	0.
	-123.	LOSS		-14.	-9.	0.	-29.	-28.	-119.	0.
MAR	7.	GAIN	54.	0.	0.	0.	2.	0.	0.	1.
	-93.	LOSS		-12.	-8.	0.	-21.	-26.	-109.	0.
APR	35.87	GAIN	57.65	.57	.06	.00	8.01	.19	.66	3.78
	-32.76	LOSS		-7.60	-4.88	.00	-9.00	-15.29	-63.50	.00
MAY	79.47	GAIN	63.66	1.36	.21	.00	15.53	.63	1.89	13.11
	-5.95	LOSS		-4.89	-2.81	.00	-2.33	-8.51	-38.00	.00
JUN	162.	GAIN	63.	2.	1.	0.	24.	2.	5.	55.
	0.	LOSS		-3.	-1.	0.	0.	-4.	-14.	0.
JUL	207.	GAIN	65.	3.	1.	0.	30.	4.	14.	69.
	0.	LOSS		-2.	-1.	0.	0.	-2.	-8.	0.
AUG	189.	GAIN	58.	3.	1.	0.	26.	3.	10.	69.
	0.	LOSS		-2.	-1.	0.	0.	-2.	-8.	0.
SEP	116.	GAIN	49.	1.	1.	0.	15.	2.	6.	43.
	-9.	LOSS		-4.	-2.	0.	-3.	-7.	-26.	0.
OCT	29.36	GAIN	40.12	.29	.08	.00	4.05	.25	.81	7.17
	-32.58	LOSS		-7.94	-4.61	.00	-10.85	-14.08	-52.21	.00
NOV	6.88	GAIN	31.42	.02	.00	.00	.84	.00	.02	1.12
	-79.01	LOSS		-10.96	-6.66	.00	-22.08	-20.37	-78.08	.00
DEC	0.	GAIN	29.	0.	0.	0.	0.	0.	0.	0.
	-167.	LOSS		-16.	-10.	0.	-41.	-31.	-130.	0.
TOT	833.	GAIN	587.	12.	4.	0.	125.	12.	38.	261.
	-711.	LOSS		-101.	-61.	0.	-178.	-190.	-784.	0.

MAX HEATING LOAD= -620930. BTUH ON DEC 18 HOUR 8    AMBIENT TEMP 1.  
 MAX COOLING LOAD= 572715. BTUH ON JUL 3 HOUR 12    AMBIENT TEMP 86.

ZONE UA BTU/HR-F    4135.5

BEACON Energy Analysis By Energy Systems Engineers, Inc.

1720.I

BLDG 1720 - E.M. BARRACKS BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	76.	69.	5 29	15 4	64. 11.	4.93	23.68	2.56	33.68
FEB	70.	76.	69.	17 2	12 3	57. 15.	4.45	21.38	2.31	30.42
MAR	71.	76.	69.	12 3	12 4	74. 17.	4.93	23.68	2.56	33.68
APR	73.	76.	70.	30 9	12 4	80. 31.	4.77	22.91	2.48	32.60
MAY	75.	76.	70.	28 11	12 4	85. 38.	4.93	23.68	2.56	33.68
JUN	76.	77.	70.	27 17	13 5	88. 56.	4.77	22.91	2.48	32.60
JUL	76.	77.	70.	3 10	12 5	86. 57.	4.93	23.68	2.56	33.68
AUG	76.	77.	70.	12 25	12 5	86. 52.	4.93	23.68	2.56	33.68
SEP	74.	77.	70.	3 15	12 4	89. 41.	4.77	22.91	2.48	32.60
OCT	73.	76.	70.	5 28	13 4	80. 30.	4.93	23.68	2.56	33.68
NOV	71.	76.	69.	7 3	14 4	73. 17.	4.77	22.91	2.48	32.60
DEC	70.	76.	68.	23 18	14 8	70. 1.	4.93	23.68	2.56	33.68
YEAR							58.02	278.77	30.15	396.61

BLDG 1720 - E.M. BARRACKS    BASERUN (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	700	13	0	0	-.5722E+06	.0000
FEB	569	44	0	0	-.4927E+06	.1076E+06
MAR	529	119	0	0	-.4902E+06	.2729E+06
APR	281	291	0	0	-.2903E+06	.3136E+06
MAY	88	504	0	0	-.1771E+06	.3875E+06
JUN	7	657	0	0	-.2836E+05	.5044E+06
JUL	0	712	0	0	.0000	.5727E+06
AUG	6	702	0	0	-.4310E+05	.5347E+06
SEP	116	528	0	0	-.1565E+06	.5375E+06
OCT	325	271	0	0	-.2611E+06	.3777E+06
NOV	517	96	0	0	-.3915E+06	.2429E+06
DEC	703	11	3	0	-.6209E+06	.1034E+06
YEAR	3841	3948	3	0	-.6209E+06	.5727E+06

## SYSTEM TOTALS

MONTH	ENERGY CONSUMPTION				TOTAL INTERNAL		MAXIMUM ELECTRIC DEMAND KW
	HEATING MILLION BTU	COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH	HEAT GAIN MILLION BTU	
JAN	242.52	.00	4.93	23.68	.75	33.68	17.1
FEB	182.39	.01	4.45	21.38	.68	30.42	17.1
MAR	146.89	.47	4.93	23.68	.75	33.68	26.7
APR	61.38	2.14	4.77	22.91	.73	32.60	28.7
MAY	15.38	4.32	4.93	23.68	.75	33.68	32.9
JUN	1.04	8.69	4.77	22.91	.73	32.60	38.9
JUL	.00	10.83	4.93	23.68	.75	33.68	41.4
AUG	.89	10.02	4.93	23.68	.75	33.68	36.2
SEP	20.26	6.44	4.77	22.91	.73	32.60	35.4
OCT	65.43	1.95	4.93	23.68	.75	33.68	29.0
NOV	131.57	.52	4.77	22.91	.73	32.60	25.5
DEC	240.18	.03	4.93	23.68	.75	33.68	17.1
YEAR	1107.91	45.42	58.02	278.77	8.83	396.61	41.4

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 77368. BTU/(SQFT-YEAR)

BLDG 1720 - E.M. BARRACKS      BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.5722E+06
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.1076E+06	-.4927E+06
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.2729E+06	-.4902E+06
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.3136E+06	-.2903E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.3875E+06	-.1771E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.5044E+06	-.2836E+05
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.5727E+06	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.5347E+06	-.4310E+05
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.5375E+06	-.1565E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.3777E+06	-.2611E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.2429E+06	-.3915E+06
DEC	883.	604.	1.000	35.	0.	0.	0	3	.1034E+06	-.6209E+06

BLDG 1720 - E.M. BARRACKS NIGHT SETBACK (FT LEONARD WOOD, MO)

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----- PROGRAM CONTROL OPTIONS -----
COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1
SKY CLEARNESS FACTOR (CLN) 1.000000
NUMBER OF ZONES (NZ) 1
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0
----- SITE AND BUILDING DATA -----

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\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 8.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 2.900000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 190625.000000

FLOOR AREA (SQFT) 22876.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 620930.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMA) -725350.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 228760.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 1348.000000

INFILTRATION PROFILE

.800	.800	.800	.800	.800	.800	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	.800	.800	.800

A FACTOR IN INFILTRATION EQUATION (CINA) 4.240000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 23702.360000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 294.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 98.000000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	.00	90.00	180.00	-90.00
WALL AREA SQFT (AWLL)	4236.0	4069.0	4236.0	4038.0
WINDOW AREA SQFT (AWND)	.0	1148.0	.0	1179.0
WINDOW HEIGHT FT (WNDH)	.0	10.0	.0	10.0
WINDOW WIDTH FT (WNDW)	.0	114.8	.0	117.9
WIDTH OF OVERHANG (WOH)	.0	.0	.0	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0



MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.137	.110	.138
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00405	.00505	.00405	.00508
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00001	.00001	.00001	.00001
N=2	.00056	.00070	.00056	.00071
N=3	.00223	.00278	.00223	.00280
N=4	.00116	.00144	.00116	.00145
N=5	.00009	.00011	.00009	.00011
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.71940	-1.71940	-1.71940	-1.71940
N=3	.84375	.84375	.84375	.84375
N=4	-.09022	-.09022	-.09022	-.09022
N=5	.00268	.00268	.00268	.00268
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7721.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	3.441956E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.193E-02 .199E-01 .120E-01 .540E-03	771.	771.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.800000E-01		

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
		16.	13093.	21600.	10080.		
		HOURLY FRACTION OF PEAK					
1	.200	.300	1.000	1.000	69.0	76.0	
2	.200	.300	1.000	1.000	69.0	76.0	
3	.200	.300	1.000	1.000	69.0	76.0	
4	.200	.300	1.000	1.000	69.0	76.0	
5	.400	.300	1.000	1.000	69.0	76.0	
6	.800	.500	1.000	1.000	69.0	76.0	
7	1.000	.500	.600	.600	69.0	76.0	
8	.200	.300	.400	.400	69.0	76.0	
9	.200	.300	.100	.100	69.0	76.0	
10	.200	.300	.100	.100	69.0	76.0	
11	.200	.300	.100	.100	69.0	76.0	
12	.200	.300	.100	.100	69.0	76.0	

13	.200	.300	.100	.100	69.0	76.0
14	.200	.300	.100	.100	69.0	76.0
15	.200	.300	.100	.100	69.0	76.0
16	.200	.500	.300	.300	69.0	76.0
17	.400	.600	.500	.500	69.0	76.0
18	.800	.700	.800	.800	69.0	76.0
19	1.000	.900	.900	.900	69.0	76.0
20	1.000	.900	.900	.900	69.0	76.0
21	1.000	.900	.900	.900	69.0	76.0
22	.500	.500	1.000	1.000	69.0	76.0
23	.200	.300	1.000	1.000	69.0	76.0
24	.200	.300	1.000	1.000	69.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					37800.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					55.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					0.000000E+00	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.250000E-01	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					620930.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					776162.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					725350.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					134096.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 1720 - E.M. BARRACKS NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -162.	GAIN LOSS	33. -16.	0. -10.	0. 0.	0. 0.	0. -39.	0. -31.	0. -133.	0. 0.
FEB	0. -117.	GAIN LOSS	44. -13.	0. -9.	0. 0.	0. 0.	0. -28.	0. -27.	0. -115.	0. 0.
MAR	7. -88.	GAIN LOSS	54. -12.	0. -8.	0. 0.	0. 0.	2. -20.	0. -25.	0. -106.	1. 0.
APR	34.33 -30.09	GAIN LOSS	57.65 -7.55	.51 -4.87	.04 0.00	.00 0.00	7.66 -8.64	.14 -15.26	.47 -62.02	3.67 .00
MAY	76.93 -5.18	GAIN LOSS	63.66 -5.01	1.25 -2.93	.16 0.00	.00 0.00	14.73 -2.39	.48 -8.87	1.42 -37.45	13.04 .00
JUN	157. 0.	GAIN LOSS	63. -3.	2. -1.	0. 0.	0. 0.	22. 0.	1. -4.	5. -14.	54. 0.
JUL	201. 0.	GAIN LOSS	65. -2.	3. -1.	1. 0.	0. 0.	29. 0.	4. -3.	12. -9.	69. 0.
AUG	183. 0.	GAIN LOSS	58. -2.	3. -1.	1. 0.	0. 0.	24. 0.	3. -3.	9. -9.	68. 0.
SEP	111. -8.	GAIN LOSS	49. -4.	1. -2.	0. 0.	0. 0.	14. -3.	1. -7.	5. -27.	43. 0.
OCT	27.71 -29.78	GAIN LOSS	40.12 -7.89	.25 -4.58	.06 0.00	.00 0.00	3.77 -10.50	.20 -13.99	.64 -50.80	6.95 .00
NOV	6.47 -74.14	GAIN LOSS	31.42 -10.73	.01 -6.49	.00 0.00	.00 0.00	.78 -21.18	.00 -19.88	.00 -75.34	1.12 .00
DEC	0. -159.	GAIN LOSS	29. -16.	0. -10.	0. 0.	0. 0.	0. -39.	0. -30.	0. -126.	0. 0.
TOT	806. -674.	GAIN LOSS	587. -101.	11. -61.	3. 0.	0. 0.	119. -172.	10. -189.	33. -765.	260. 0.

MAX HEATING LOAD= -620930. BTUH ON DEC 18 HOUR 8 AMBIENT TEMP 1.  
 MAX COOLING LOAD= 562842. BTUH ON JUL 3 HOUR 12 AMBIENT TEMP 86.

ZONE UA BTU/HR-F 4135.5

BLDG 1720 - E.M. BARRACKS NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	69.	77.	68.	5 29	15 4	64. 11.	4.93	23.68	2.56	33.68
FEB	70.	77.	68.	17 2	13 3	59. 15.	4.45	21.38	2.31	30.42
MAR	71.	77.	68.	12 3	12 4	74. 17.	4.93	23.68	2.56	33.68
APR	73.	77.	69.	30 9	12 4	80. 31.	4.77	22.91	2.48	32.60
MAY	75.	77.	69.	28 11	12 4	85. 38.	4.93	23.68	2.56	33.68
JUN	76.	78.	69.	27 17	13 5	88. 56.	4.77	22.91	2.48	32.60
JUL	77.	78.	70.	3 10	12 5	86. 57.	4.93	23.68	2.56	33.68
AUG	76.	78.	69.	12 25	12 5	86. 52.	4.93	23.68	2.56	33.68
SEP	75.	78.	69.	3 15	12 4	89. 41.	4.77	22.91	2.48	32.60
OCT	73.	77.	69.	5 28	13 4	80. 30.	4.93	23.68	2.56	33.68
NOV	70.	77.	68.	7 3	14 4	73. 17.	4.77	22.91	2.48	32.60
DEC	69.	77.	68.	23 18	14 8	70. 1.	4.93	23.68	2.56	33.68
YEAR							58.02	278.77	30.15	396.61

---CARD 32--- Exposed Floor Parameters				-----Exposed Floor-----						
Room	Floor	Perimeter	Loss	Floor	Floor	Const	Temp	Cooling	Heating	Adjacent
Number	Number	Length	Coefficient	Area	U-Value	Type	Flag	Temp	Temp	Room No
1	1	36	.67							
2	1	259	.67							
3	1	120	.67							
4	1	37	.67							
5	1	169	.67							

-----CARD 34-- Internal Shading -----						----- Lockouts -----					
Overall			Schedule	Shade	Visible	Min	Max	Solar	Max	Glare	
Shading	Overall	Shading									
Type	U-Value	Coefficient	Code	Location	Transmittance	OADB	Solar	Ctrl	Prob	Glare	
3	.452	.58	FL-INSHD								

----- System Section Alternative #1 -----

Number	Description
1	BLDG 1350 BASERUN FT LEONARD WOOD

-----OPTIONAL VENTILATION SYSTEM-----

Fan

System		Ventil					Fan
Set	System	Deck	Cooling	Heating	Cooling	Heating	Static
Number	Type	Location	SADEVh	SADEVh	Schedule	Schedule	Pressure
1	UV						
2	UH						
3	SZ						
4	SZ						
5	SZ						

[illegible]

-----CARD 42----- Fan SP and Duct Parameters-----											
System	Cool	Heat	Return	Mn Exh	Aux	Rm Exh	Cool	Return	Supply	Supply	Return
Set	Fan	Fan	Fan	Fan	Fan	Fan	Fan Mtr	Fan Mtr	Duct	Duct	Air
Number	SP	SP	SP	SP	SP	SP	Loc	Loc	Ht Gn	Loc	Path
1	1.75	1.75		2.25			OMIT			OTHER	ROOMDK
2	0.6	0.6								OTHER	ROOMDK
3	2.5	2.5					OMIT			OTHER	DUCTED
4	2.0	2.0					OMIT			OTHER	ROOMDK
5	3.0	3.0					OMIT			OTHER	DUCTED

-----CARD 43-- Airflow Design Temperatures

-----CARD 43-- Airflow Design Temperatures											
System	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Design	
Set	Cooling	Cooling	Heating	Heating	Cooling	Cooling	Preheat	Preheat	Room	Ht Rec	
Number	SADB	SADB	SADB	SADB	Lv DB	Lv DB	Lv DB	Lv DB	RH	Diff	
1											
2											
3											
4											
5	49.8	49.8									

-----CARD 44-- System Options

-----CARD 44-- System Options								----- Exhaust Air Heat Recovery -----			
System	Econ	Econ	Max Pct	Direct	Indirect	1st Stage					
Set	Type	On	Outside	Evap	Evap	Evap	Fan	---	Effectiveness	---	Control Method
Number	Flag	Point	Air	Cooling	Cooling	Cooling	Cycling	System	Room	System	Room
1											
2											
3	DRY-BULB	65	100								
4											
5	DRY-BULB	65	100								

-----CARD 45--- Equipment Schedules

-----CARD 45----- Equipment Schedules -----										
System	Main		Direct	Indirect	Auxiliary	Main	Main			Auxiliary
Set	Cooling		Evap	Evap	Cooling	Heating	Preheat	Reheat	Mech.	Heating
Number	Coil	Economizer	Coil	Coil	Coil	Coil	Coil	Coil	Humidity	Coil
1	OFF	OFF	OFF	OFF	OFF	AVAIL	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	OFF	OFF	AVAIL	OFF	OFF	OFF	OFF
3	AVAIL	AVAIL	OFF	OFF	OFF	AVAIL	OFF	OFF	OFF	OFF
4	OFF	OFF	OFF	OFF	OFF	AVAIL	OFF	OFF	OFF	OFF
5	AVAIL	AVAIL	OFF	OFF	OFF	AVAIL	OFF	OFF	OFF	OFF

-----CARD 47-- Fan Overrides

[illegible]

-----CARD 47-- Fan Overrides -----

Sys	Clg	Htg	Ret	Mn Exh	Aux	Rm Exh	Opt Vnt	-----MAIN COOLING FAN-----				
Set	Fan	Fan	Fan	Fan	Fan	Fan	Sys Fan	Mech	Air	Air	Size	Config
Num	Eff	Eff	Eff	Eff	Eff	Eff	Eff	Eff	Value	Units	Meth	
4												
5												

-----CARD 48-- Cooling Capacity Overrides -----

System	People	Lights	Misc	-----MAIN COOLING-----				-----AUX COOLING-----	
Set	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Value	Units	Value	Value	Units	Sizing	Location	Value	Units
1				0	MBH				
2				0	MBH				
3				120.7	MBH				
4				0	MBH				
5									

-----CARD 49-- Heating Capacity Overrides -----

System	-----MAIN HEATING-----		-----PREHEAT-----		-----REHEAT-----		-----HUMIDIFICATION-----		-----AUX HEATING-----	
Set	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
1	278.9	MBH	0	MBH	0	MBH				
2			0	MBH	0	MBH				
3	87.15	MBH	0	MBH	0	MBH				
4			0	MBH	0	MBH				
5	113.15	MBH	0	MBH	0	MBH				

----- Equipment Section Alternative #1 -----

-----CARD 59-- Equipment Description / TOD Schedules -----

Alternative	Equipment	Elec Consump	Elec Demand	Time of Day	Limit	Alternative Description
Number	Schedule	Schedule	Max KW			
1						BLDG 1350 BASERUN FT LEONARD WOOD

-----CARD 60--- Cooling Load Assignment-----

Load	All Coil	Cooling										
Asgn	Loads To	Equipment	-Group 1-	-Group 2-	-Group 3-	-Group 4-	-Group 5-	-Group 6-	-Group 7-	-Group 8-	-Group 9-	
Ref	Cool Ref	Sizing	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	
1	1		3	3								
2	2		5	5								

```

-----CARD 62-- Cooling Equipment Parameters -----
Cool Equip  Num  -----COOLING-----  -----HEAT RECOVERY-----  Seq  Demand
Ref Code    Of  --Capacity--  ---Energy---  --Capacity--  ---Energy---  Order Seq Limit
Num Name    Units Value Units  Value Units  Value Units  Value Units  Num Type Number
1  EQ1170S  1    10    TONS    .93    KW-TON
2  EQ1170S  1    15    TONS    .94    KW-TON

```

```

-----CARD 65-- Heating Load Assignment -----
Load      All Coil
Assignment Loads To  -Group 1- -Group 2- -Group 3- -Group 4- -Group 5- -Group 6- -Group 7- -Group 8- -Group 9-
Reference Heating Ref Begin End Begin End Begin End Begin End Begin End Begin End Begin End
1          1          1      5

```

```

-----CARD 67-- Heating Equipment Parameters -----
Heat Equip  Number HW Pmp      Energy      Seq  Switch      Demand
Ref Code    Of  Full Ld      Cap'y      Rate      Order over  Hot  Misc.      Limit
Number Name  Units Value Units  Value Units  Value Units  Number Control Strg Acc.  Cogen Number
1  EQ2001    1    1.492  KW    658  MBH    80    PCTEFF

```

```

-----CARD 69-- Fan Equipment Parameters -----
System
Set      Cooling  Heating  Return  Exhaust  Auxiliary  Room  Optional
Number   Fan       Fan       Fan       Fan       Supply     Exhaust Ventilation
1        EQ4003    EQ4003
2        EQ4381    EQ4381
3        EQ4003    EQ4003
4        EQ4003    EQ4003
5        EQ4003    EQ4003

```

```

-----CARD 70-- Fan Equipment KW Overrides -----
-----MAIN SYSTEM-----  --OTHER SYSTEM--  ----DEMAND LIMIT PRIORITY----
System Cool Heat Ret  Exh  Aux  Room Opt      Room Opt
Set      Fan  Fan  Fan  Fan  Sup  Exh  Vent  Cool Heat Aux  Exh  Vent
Number  KW   KW   KW   KW   KW   KW   KW   Fan  Fan  Fan  Fan  Fan
1        2.238 2.238
2        .187 .187
3        2.238 2.238
4        2.238 2.238
5        3.73 3.73

```



Utility Description Reference Table

Schedules:

AVAIL AVAILABLE (100%)  
CDDC78SM CLG DDC T-STAT AT 78 (MAY THRU SEPT)  
CLG75SUM COOLING TSTAT AT 75 (MAY THRU SEPT)  
CSB75SUM COOLING SB TSTAT AT 75 (MAY THRU SEPT)  
E-1350Z1 EQUIPMENT SCHEDULE - BLDG 1350 ZONE 1  
E-1350Z2 EQUIPMENT SCHEDULE - BLDG 1350 ZONE 2  
E-1350Z3 EQUIPMENT SCHEDULE - BLDG 1350 ZONE 3  
E-1350Z4 EQUIPMENT SCHEDULE - BLDG 1350 ZONE 4  
E-1350Z5 EQUIPMENT SCHEDULE - BLDG 1350 ZONE 5  
FL-INSHD INTERNAL SHADING: VENITIAN BLINDS  
HDDC65WT HEATING DDC T-STAT AT 65 (OCT TO APR)  
HDDC68WT HEATING DDC T-STAT AT 68 (OCT TO APR)  
HSB67WNT HEATING SB T-STAT AT 67 (OCT TO APR)  
HSB70WNT HEATING SB T-STAT AT 70 (OCT TO APR)  
HTG67WNT HEATING T-STAT AT 67 (OCT TO APR)  
HTG70WNT HEATING T-STAT AT 70 (OCT TO APR)  
L-1350Z1 LIGHTING SCHEDULE - BLDG 1350 ZONE 1  
L-1350Z2 LIGHTING SCHEDULE - BLDG 1350 ZONE 2  
L-1350Z3 LIGHTING SCHEDULE - BLDG 1350 ZONE 3  
L-1350Z4 LIGHTING SCHEDULE - BLDG 1350 ZONE 4  
L-1350Z5 LIGHTING SCHEDULE - BLDG 1350 ZONE 5  
OFF ALWAYS OFF  
P-1350Z1 LIGHTING SCHEDULE - BLDG 1350 ZONE 1  
P-1350Z2 PEOPLE SCHEDULE - BLDG 1350 ZONE 2  
P-1350Z3 PEOPLE SCHEDULE - BLDG 1350 ZONE 3  
P-1350Z4 PEOPLE SCHEDULE - BLDG 1350 ZONE 4  
P-1350Z5 PEOPLE SCHEDULE - BLDG 1350 ZONE 5

System:

SZ SINGLE ZONE  
UH UNIT HEATERS  
UV UNIT VENTILATOR

Equipment:

Cooling:  
EQ1170S AIR-CLD COND COMP <20 TONS  
Heating:  
EQ2001 GAS FIRE TUBE HOT WATER  
Fan:  
EQ4003 FC CENTRIF. FAN C.V.  
EQ4381 PROPELLER FAN

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Page #32

Schedule Name: AVAIL  
Project: AVAILABLE (100)  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: BTG  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	100
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: CDDC78SM

Project: CLG DDC T-STAT AT 78 (MAY THRU

Location:

Client:

Program User:

Comments: CLG DDC T-STAT AT 78 (MAY THRU

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 90  
6 78  
19 90  
24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Page #34

Schedule Name: CLG75SUM  
Project: COOLING TSTAT AT 75 (MAY THRU S  
Location:  
Client:  
Program User:  
Comments: COOLING TSTAT AT 75 (MAY THRU

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 75  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: CSB75SUM  
Project: COOLING SB TSTAT AT 75 (MAY THR  
Location:  
Client:  
Program User:  
Comments: COOLING SB TSTAT AT 75 (MAY TH

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 90  
6 75  
19 90  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Schedule Name: E-1350Z1  
Project: EQUIPMENT SCHEDULE - BLDG 1350  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - KITCHEN

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent  
-----

0	10
5	80
6	90
7	60
8	10
11	90
12	80
13	10
16	90
17	80
18	10
24	

Schedule Name: E-1350Z2  
Project: EQUIPMENT SCHEDULE - BLDG 1350  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - SHIPPING

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent  
-----

0	0
7	100
21	0
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent  
-----

0	0
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Page #38

Schedule Name: E-1350Z3  
Project: EQUIPMENT SCHEDULE - BLDG 1350  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - CLASSROO

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

-----  
0 50  
24

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

-----  
0 50  
24



TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: E-135024  
Project: EQUIPMENT SCHEDULE - BLDG 1350  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ASSEMBLY

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	50
5	90
8	50
11	90
13	50
16	90
18	50
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: E-1350Z5  
Project: EQUIPMENT SCHEDULE - BLDG 1350  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ADMIN. OF

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent  
-----

0	10
7	90
11	70
12	60
13	90
16	30
21	10
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent  
-----

0	10
24	

Schedule Name: FL-INSED  
Project: INTERNAL SHADING: VENITIAN BLIN  
Location: FT LEONARD WOOD  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: INTERNAL SHADING SCHEDULE

Starting Month: JAN Ending Month: APR  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util Percent
0	75
24	

Starting Month: MAY Ending Month: SEP  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util Percent
0	35
24	

Starting Month: OCT Ending Month: DEC  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util Percent
0	75
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	25
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: HDDC65WT  
Project: HEATING DDC T-STAT AT 65 (OCT T  
Location:  
Client:  
Program User:  
Comments: HEATING DDC T-STAT AT 65 (OCT

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 55  
6 65  
19 55  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 35  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 55  
6 65  
19 55  
24

TRACE 600 input file D:\3204\TRACE\1350.TM by Trans Customer Direct Service Network

Schedule Name: HDDC68WT

Project: HEATING DDC T-STAT AT 68 (OCT T

Location:

Client:

Program User:

Comments: HEATING DDC T-STAT AT 68 (OCT

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	68
19	55
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	35
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	68
19	55
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trans Customer Direct Service Network

Schedule Name: HSB67WNT  
 Project: HEATING SB T-STAT AT 67 (OCT TO  
 Location:  
 Client:  
 Program User:  
 Comments: HEATING SB T-STAT AT 67 (OCT T

Starting Month: JAN Ending Month: APR  
 Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	67
19	55
24	

Starting Month: MAY Ending Month: SEP  
 Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	35
24	

Starting Month: OCT Ending Month: DEC  
 Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	67
19	55
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: HSE70WNT  
Project: HEATING SB T-STAT AT 70 (OCT TO  
Location:  
Client:  
Program User:  
Comments: HEATING SB T-STAT AT 70 (OCT T

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 55  
6 70  
19 55  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 35  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 55  
6 70  
19 55  
24

Schedule Name: HTG67WNT  
Project: HEATING T-STAT AT 67 (OCT TO AP  
Location:  
Client:  
Program User:  
Comments: HEATING T-STAT AT 67 (OCT TO A

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature  
-----  
0 67  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature  
-----  
0 35  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature  
-----  
0 67  
24



Schedule Name: BTG7OWNT  
Project: HEATING T-STAT AT 70 (OCT TO AP  
Location:  
Client:  
Program User:  
Comments: HEATING T-STAT AT 70 (OCT TO A

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 70  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 35  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 70  
24

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Page #48

Schedule Name: L-1350Z1  
Project: LIGHTING SCHEDULE - BLDG 1350 Z  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHTING SCHEDULE - KITCHEN

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	10
5	100
8	10
11	100
13	10
16	100
18	10
24	

Schedule Name: L-1350Z2  
Project: LIGHTING SCHEDULE - BLDG 1350 Z  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHTING SCHEDULE - SHIPPING

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

-----  
0 10  
7 100  
11 80  
13 100  
21 10  
24

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

-----  
0 10  
24

Schedule Name: L-1350Z3  
Project: LIGHTING SCHEDULE - BLDG 1350 Z  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHTING SCHEDULE - CLASSROOM

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	10
7	100
11	50
12	40
13	100
16	40
21	10
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	10
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Page #51

Schedule Name: L-1350Z4  
Project: LIGHTING SCHEDULE - BLDG 1350 Z  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHTING SCHEDULE - ASSEMBLY H

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	10
7	100
20	10
24	

Schedule Name: L-1350Z5  
Project: LIGHTING SCHEDULE - BLDG 1350 Z  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHTING SCHEDULE - ADMIN. OFF

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	10
7	100
11	80
12	50
13	100
16	50
21	10
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	10
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: OFF  
 Project: ALWAYS OFF  
 Location:  
 Client:  
 Program User:  
 Comments:

Starting Month: JAN Ending Month: HTG  
 Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	0
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Page #54

Schedule Name: P-1350Z1  
Project: PEOPLE SCHEDULE - BLDG 1350 ZON  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - KITCHEN

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
5	100
8	0
11	100
13	0
16	100
18	0
24	



TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: P-1350Z2  
 Project: PEOPLE SCHEDULE - BLDG 1350 ZON  
 Location: FT LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: EMC ENGINEERS, INC.  
 Comments: PEOPLE SCHEDULE - SHIPPING

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	0
7	100
11	50
13	100
21	0
24	

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	0
24	

TRACE 600 input file D:\3204\TRACE\1350.TM by Trane Customer Direct Service Network

Schedule Name: P-1350Z3  
Project: PEOPLE SCHEDULE - BLDG 1350 ZON  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - CLASSROOMS

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	0
7	100
11	30
12	20
13	100
16	20
21	0
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	0
24	

Schedule Name: P-1350Z4  
Project: PEOPLE SCHEDULE - BLDG 1350 ZON  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - ASSEMBLY HAL

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	0
7	100
8	60
9	30
11	60
12	100
13	30
15	50
16	100
17	40
18	20
21	0
24	

Schedule Name: P-1350Z5

Project: PEOPLE SCHEDULE - BLDG 1350 ZON

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: PEOPLE SCHEDULE - ADMINISTRATI

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	0
7	100
11	80
12	50
13	100
16	20
21	0
24	

Starting Month: JAN Ending Month: DEC

Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
24	

```
*****
*****
**
**          T R A C E    6 0 0    A N A L Y S I S          **
**
**          by          **
**
*****
*****
```

EEAP STUDY, EXPANSION OF EMCS  
FT. LEONARD WOOD, MO  
US ARMY  
E M C ENGINEERS, INC.

Weather File Code:	SPRINGFM
Location:	SPRINGFIELD, MISSOURI
Latitude:	37.0 (deg)
Longitude:	93.0 (deg)
Time Zone:	6
Elevation:	1,265 (ft)
Barometric Pressure:	28.5 (in. Hg)
Summer Clearness Number:	0.97
Winter Clearness Number:	0.97
Summer Design Dry Bulb:	94 (F)
Summer Design Wet Bulb:	78 (F)
Winter Design Dry Bulb:	3 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20
Air Density:	0.0724 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0621 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,675.1 (Btu-min./hr/cuft)
Enthalpy Factor:	4.3449 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: TETD/Time Averaging

Time/Date Program was Run: 13:24: 7 3/16/93  
Dataset Name: 1350 .TM

AIRFLOW - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	UV	3,036	0	4,686	4,776	3,126	0	0
2	UH	0	0	1,480	0	438	0	0
3	SZ	600	3,080	3,080	3,294	3,080	0	0
4	SZ	660	0	3,720	3,870	810	0	0
5	SZ	380	3,800	3,800	4,096	3,800	0	0
Totals		4,676	6,880	16,766	16,036	11,254	0	0

CAPACITY - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	UV	0.0	0.0	0.0	0.0	-278,900	0	0	0	0	0	-278,900
2	UH	0.0	0.0	0.0	0.0	-108,332	0	0	0	0	0	-108,332
3	SZ	10.1	0.0	0.0	10.1	-87,150	0	0	0	0	0	-87,150
4	SZ	0.0	0.0	0.0	0.0	-67,708	0	0	0	0	0	-67,708
5	SZ	13.0	0.0	0.0	13.0	-113,150	0	0	0	0	0	-113,150
Totals		23.1	0.0	0.0	23.1	-655,240	0	0	0	0	0	-655,240

The building peaked at hour 15 month 7 with a capacity of 22.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent	Cooling				Heating		Floor Area Sq Ft
			Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	UV	64.79	0.00	0.0	0.0	0.00	7.23	-430.40	648
2	Main	UH	0.00	0.00	0.0	0.0	0.00	0.31	-22.91	4,728
3	Main	SZ	19.48	0.71	306.2	433.2	27.70	0.71	-20.00	4,357
4	Main	SZ	17.74	0.00	0.0	0.0	0.00	1.67	-30.34	2,232
5	Main	SZ	10.00	0.67	291.9	438.8	27.35	0.67	-19.81	5,712

System 1 Block UV - UNIT VENTILATOR

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 3

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-1,085	-1,085	0.48
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-263	-263	0.12
Wall Cond	0	0		0	0.00	*	0	0.00	*	-5,975	-5,975	2.63
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	-1,616	-1,616	0.71
Infiltration	0			0	0.00	*	0	0.00	*	-6,404	-6,404	2.82
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-15,343	-15,343	6.76
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	-216,038	95.22
Sup. Fan Heat				0	0.00	*		0.00	*		4,499	-1.98
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-15,343	-226,883	100.00

-----COOLING COIL SELECTION-----

-----AREAS-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Floor	648
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	36
Totals	0.0	0.0									Roof	648
											Wall	765
												0
												6
												1

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA		Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent							
Main Htg	-278.9	4,686	17.0	73.1	Infil	0	3,036	Clg Cfm/Sqft	0.00	EADE	0.0	73.1
Aux Htg	0.0	0	0.0	0.0	Supply	0	4,686	Clg Cfm/Ton	0.00	Plenum	0.0	70.0
Preheat	-0.0	4,686	27.5	0.0	Mincfm	0	0	Clg Sqft/Ton	0.00	Return	0.0	70.0
Reheat	0.0	0	0.0	0.0	Return	0	4,686	Clg Btuh/Sqft	0.00	Ret/OA	0.0	26.6
Humidif	0.0	0	0.0	0.0	Exhaust	0	3,036	No. People	0	Runarnd	0.0	70.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	64.8	Fn MtrTD	0.3	0.3
Total	-278.9				Auxil	0	0	Htg Cfm/Sqft	7.23	Fn BldTD	0.2	0.2
								Htg Btuh/Sqft	-430.40	Fn Frict	0.7	0.7

System 2 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==>	Mo/Hr: 0/ 0				*	Mo/Hr: 0/ 0				*	Mo/Hr: 13/ 1			
Outside Air ==>	OADB/WB/HR: 0/ 0/ 0.0				*	OADB: 0				*	OADB: 3			
	Space	Ret. Air	Ret. Air	Net	Perct	*	Space	Perct	*	Space Peak	Coil Peak	Perct		
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space Sens	Tot Sens	Of Tot		
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)		
Envelope Loads						*			*					
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Roof Cond	0	0		0	0.00	*	0	0.00	*	-38,430	-38,430	35.47		
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Glass Cond	0	0		0	0.00	*	0	0.00	*	-1,507	-1,507	1.39		
Wall Cond	0	0		0	0.00	*	0	0.00	*	-28,149	-28,149	25.98		
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00		
Exposed Floor	0			0	0.00	*	0	0.00	*	-11,106	-11,106	10.25		
Infiltration	0			0	0.00	*	0	0.00	*	-29,772	-29,772	27.48		
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-108,963	-108,963	100.58		
Internal Loads						*			*					
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
People	0			0	0.00	*	0	0.00	*	0	0	0.00		
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00		
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00		
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00		
Sup. Fan Heat				0	0.00	*		0.00	*		631	-0.58		
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00		
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00		
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00		
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00		
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00		
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-108,963	-108,332	100.00		

-----COOLING COIL SELECTION-----										-----AREAS-----		
Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)	
(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains			
Main Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Floor	4,728	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	5,700	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	259	
Totals	0.0	0.0								Roof	4,728	0 0
										Wall	3,752	36 1

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			-----ENGINEERING CHECKS--		-----TEMPERATURES (F)---		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA		Type	Clg	Htg	
(Mbh)	(cfm)	Deg F	Deg F	Vent			Clg Cfm/Sqft	0.00	SADB	0.0	136.3	
Main Htg	-108.3	1,480	67.4	Infil	0	438	Clg Cfm/Ton	0.00	Plenum	0.0	67.0	
Aux Htg	0.0	0	0.0	Supply	0	1,480	Clg Sqft/Ton	0.00	Return	0.0	67.0	
Preheat	0.0	0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	67.0	
Reheat	0.0	0	0.0	Return	0	1,480	No. People	0	Runarnd	0.0	67.0	
Humidif	0.0	0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.1	0.1	
Opt Vent	0.0	0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.31	Fn BldTD	0.1	0.1	
Total	-108.3			Auxil	0	0	Htg Btuh/SqFt	-22.91	Fn Frict	0.2	0.2	



System 3 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==>			Mo/Hr: 7/15			Mo/Hr: 7/15			Mo/Hr: 13/ 1					
Outside Air ==>			OADB/WB/HR: 94/ 78/124.0			OADB: 94			OADB: 3					
	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent		
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot		
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)		
Envelope Loads														
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Roof Cond	7,418	0		7,418	6.81	*	7,418	12.95	*	-7,298	-7,298	8.86		
Glass Solar	3,360	0		3,360	3.09	*	3,360	5.87	*	0	0	0.00		
Glass Cond	799	0		799	0.73	*	799	1.39	*	-3,064	-3,064	3.72		
Wall Cond	2,346	0		2,346	2.15	*	2,346	4.10	*	-12,781	-12,781	15.52		
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00		
Exposed Floor	0			0	0.00	*	0	0.00	*	-5,387	-5,387	6.54		
Infiltration	11,673			11,673	10.72	*	4,318	7.54	*	-15,228	-15,228	18.49		
Sub Total==>	25,596	0		25,596	23.50	*	18,241	31.85	*	-43,757	-43,757	53.14		
Internal Loads														
Lights	27,086	0		27,086	24.87	*	27,086	47.29	*	0	0	0.00		
People	19,200			19,200	17.63	*	11,760	20.53	*	0	0	0.00		
Misc	192	0	0	192	0.18	*	192	0.33	*	0	0	0.00		
Sub Total==>	46,477	0	0	46,477	42.68	*	39,037	68.15	*	0	0	0.00		
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00		
Outside Air	0	0	0	32,728	30.05	*	0	0.00	*	0	-42,695	51.85		
Sup. Fan Heat				4,107	3.77	*		0.00	*		4,107	-4.99		
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00		
Duct Heat PkUp		0		0	0.00	*		0.00	*		0	0.00		
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	0.00		
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00		
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00		
Grand Total==>	72,073	0	0	108,907	100.00	*	57,278	100.00	*	-43,757	-82,346	100.00		

COOLING COIL SELECTION										AREAS		
	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
Main Clg	10.1	120.7	81.5	3,080	78.7	66.4	56.2	53.6	60.0	Floor	4,357	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Part	7,520	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	ExFlr	120	
Totals	10.1	120.7								Roof	4,357	0 0
										Wall	1,722	70 4

HEATING COIL SELECTION					AIRFLOWS (cfm)			ENGINEERING CHECKS		TEMPERATURES (F)		
Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	19.5	Type	Clg	Htg	
Main Htg	-87.2	3,080	55.5	82.1	Infil	214	214	Clg Cfm/Sqft	0.71	SADB	57.5	83.4
Aux Htg	0.0	0	0.0	0.0	Supply	3,080	3,080	Clg Sqft/Ton	433.17	Plenum	75.0	70.0
Preheat	-0.0	3,080	56.9	56.2	Minclm	0	0	Clg Btuh/Sqft	27.70	Return	75.0	70.0
Reheat	0.0	0	0.0	0.0	Return	3,080	3,080	No. People	48	Runarnd	75.0	70.0
Humidif	0.0	0	0.0	0.0	Exhaust	600	600	Htg % OA	19.5	Fn MtrTD	0.4	0.4
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.71	Fn BldTD	0.3	0.3
Total	-87.2				Auxil	0	0	Htg Btuh/SqFt	-20.00	Fn Frict	0.9	0.9

System 4 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==>	Mo/Hr: 0/ 0					*	Mo/Hr: 0/ 0					*	Mo/Hr: 13/ 1				
Outside Air ==>	OADB/WB/HR: 0/ 0/ 0.0					*	OADB: 0					*	OADB: 3				
						*				*					*		
	Space	Ret. Air	Ret. Air	Net	Percent	*	Space	Percent	*	Space Peak	Coil Peak	Percent					
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space Sens	Tot Sens	Of Tot					
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)					
Envelope Loads						*			*								
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00					
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00					
Roof Cond	0	0		0	0.00	*	0	0.00	*	-3,739	-3,739	5.52					
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00					
Glass Cond	0	0		0	0.00	*	0	0.00	*	-263	-263	0.39					
Wall Cond	0	0		0	0.00	*	0	0.00	*	-8,375	-8,375	12.37					
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00					
Exposed Floor	0			0	0.00	*	0	0.00	*	-1,661	-1,661	2.45					
Infiltration	0			0	0.00	*	0	0.00	*	-10,674	-10,674	15.76					
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-24,711	-24,711	36.50					
Internal Loads						*			*								
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00					
People	0			0	0.00	*	0	0.00	*	0	0	0.00					
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00					
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00					
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00					
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	-46,965	69.36					
Sup. Fan Heat				0	0.00	*		0.00	*		3,968	-5.86					
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00					
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00					
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.00					
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00					
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00					
						*			*								
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-24,711	-67,708	100.00					

-----COOLING COIL SELECTION-----										-----AREAS-----		
Total Capacity		Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains			
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Floor	2,232	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	Part	1,610	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	ExFlr	37	
Totals	0.0	0.0								Roof	2,232	0 0
										Wall	1,043	6 1

-----HEATING COIL SELECTION-----				-----AIRFLOWS (cfm)-----				-----ENGINEERING CHECKS-----		-----TEMPERATURES (F)-----		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA			Type	Clg	Htg
(Mbh)	(cfm)	Deg F	Deg F									
Main Htg	-67.7	3,720	58.1	75.3	Vent	0	660	Clg Cfm/Sqft	0.00	SADB	0.0	76.3
Aux Htg	0.0	0	0.0	0.0	Infil	0	150	Clg Cfm/Ton	0.00	Plenum	0.0	70.0
Preheat	-0.0	3,720	58.1	-1.0	Supply	0	3,720	Clg Sqft/Ton	0.00	Return	0.0	70.0
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	58.1
Humidif	0.0	0	0.0	0.0	Return	0	3,720	No. People	0	Runarnd	0.0	70.0
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	660	Htg % OA	17.7	Fn MtrTD	0.3	0.3
Total	-67.7				Rm Exh	0	0	Htg Cfm/Sqft	1.67	Fn BldTD	0.3	0.3
					Auxil	0	0	Htg Btuh/SqFt	-30.34	Fn Frict	0.8	0.8

System 5 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK *****						CLG SPACE PEAK *****		***** HEATING COIL PEAK *****			
Peaked at Time ==>						Mo/Hr: 7/15		Mo/Hr: 13/ 1			
Outside Air ==>						OADB/WB/HR: 94/ 78/124.0		OADB: 3			
Envelope Loads	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	Space Sensible (Btuh)	Perct Of Tot (%)	Space Peak (Btuh)	Coil Peak Tot Sens (Btuh)	Perct Of Tot (%)	
Skylite Solr	0	0		0	0.00	0	0.00	0	0	0.00	
Skylite Cond	0	0		0	0.00	0	0.00	0	0	0.00	
Roof Cond	9,725	0		9,725	6.23	9,725	9.56	-9,568	-9,568	11.06	
Glass Solar	7,688	0		7,688	4.92	7,688	7.56	0	0	0.00	
Glass Cond	2,829	0		2,829	1.81	2,829	2.78	-10,855	-10,855	12.55	
Wall Cond	5,030	0		5,030	3.22	5,030	4.95	-16,441	-16,441	19.01	
Partition	0			0	0.00	0	0.00	0	0	0.00	
Exposed Floor	0			0	0.00	0	0.00	-7,586	-7,586	8.77	
Infiltration	19,445			19,445	12.45	5,973	5.87	-21,063	-21,063	24.36	
Sub Total==>	44,717	0		44,717	28.62	31,245	30.72	-65,514	-65,514	75.76	
Internal Loads											
Lights	51,099	0		51,099	32.71	51,099	50.24	0	0	0.00	
People	22,500			22,500	14.40	12,500	12.29	0	0	0.00	
Misc	12,950	0	0	12,950	8.29	12,950	12.73	0	0	0.00	
Sub Total==>	86,549	0	0	86,549	55.40	76,549	75.27	0	0	0.00	
Ceiling Load	0	0		0	0.00	0	0.00	0	-27,040	31.27	
Outside Air	0	0	0	24,963	15.98	0	0.00	0	6,080	-7.03	
Sup. Fan Heat				6,080	3.89		0.00		0	0.00	
Ret. Fan Heat		0		0	0.00		0.00		0	0.00	
Duct Heat Pkup		0		0	0.00		0.00		0	0.00	
OV/UNDR Sizing	-6,090			-6,090	-3.90	-6,090	-5.99	0	0	-0.00	
Exhaust Heat		0	0	0	0.00		0.00		0	0.00	
Terminal Bypass		0	0	0	0.00		0.00		0	0.00	
Grand Total==>	125,176	0	0	156,219	100.00	101,704	100.00	-65,514	-86,474	100.00	

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	5,712	
Main Clg	13.0	156.2	115.5	3,800	76.9	61.8	62.7	48.3	46.6	46.7	Part	10,490
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	169
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	5,712
Totals	13.0	156.2									Wall	2,408

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	10.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	380	380	Clg Cfm/Sqft	0.67	SADB	49.8	86.2
Main Htg	-113.2	3,800	56.7	84.7	Infil	296	296	Clg Cfm/Ton	291.90	Plenum	75.0	70.0
Aux Htg	0.0	0	0.0	0.0	Supply	3,800	3,800	Clg Sqft/Ton	438.77	Return	75.0	70.0
Preheat	-0.0	3,800	63.3	48.3	Minclfm	0	0	Clg Btuh/Sqft	27.35	Ret/OA	76.9	63.3
Reheat	0.0	0	0.0	0.0	Return	3,800	3,800	No. People	50	Runarnd	75.0	70.0
Humidif	0.0	0	0.0	0.0	Exhaust	380	380	Htg % OA	10.0	Fn MtrTD	0.5	0.5
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.67	Fn BldTD	0.4	0.4
Total	-113.2				Auxil	0	0	Htg Btuh/SqFt	-19.81	Fn Frict	1.1	1.1

MAIN SYSTEM COOLING - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- P E A K C O O L I N G L O A D S -----

(Main System)

		----- Space -----							----- Coil -----								
Room		Peak	OA	Rm	Supp.	Space	Space	Space	Peak	OA	Rm	Supp.	Coil	Coil	Coil		
		Time	Cond.	Dry	Dry	Air	Sens.	Lat.	Time	Cond.	Dry	Dry	Air	Sens.	Lat.		
Number	Description	Mo/Hr	DB/WB	Blb	Bulb	Flow	Load	Load	Mo/Hr	DB/WB	Blb	Bulb	Flow	Load	Load		
			(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		
3	CLASSROOMS	7/15	94	78	75	57.5	3,080	57,278	14,795	7/15	94	78	75	57.5	3,080	73,493	35,415
Zone	3 Total/Ave.		94	78	75	57.5	3,080	57,278	14,795		94	78	75	57.5	3,080	73,493	35,415
Zone	3 Block	7/15	94	78	75	57.5	3,080	57,278	14,795	7/15	94	78	75	57.5	3,080	73,493	35,415
System	3 Total/Ave.		94	78	75	57.5	3,080	57,278	14,795		94	78	75	57.5	3,080	73,493	35,415
System	3 Block	7/15	94	78	75	57.5	3,080	57,278	14,795	7/15	94	78	75	57.5	3,080	73,493	35,415
5	ADMINISTRATION	7/15	94	78	75	49.8	3,800	101,704	23,472	7/15	94	78	75	49.8	3,800	115,452	40,767
Zone	5 Total/Ave.		94	78	75	49.8	3,800	101,704	23,472		94	78	75	49.8	3,800	115,452	40,767
Zone	5 Block	7/15	94	78	75	49.8	3,800	101,704	23,472	7/15	94	78	75	49.8	3,800	115,452	40,767
System	5 Total/Ave.		94	78	75	49.8	3,800	101,704	23,472		94	78	75	49.8	3,800	115,452	40,767
System	5 Block	7/15	94	78	75	49.8	3,800	101,704	23,472	7/15	94	78	75	49.8	3,800	115,452	40,767

MAIN SYSTEM HEATING - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- P E A K H E A T I N G L O A D S -----  
(Main System)

Room Number	Description	Floor Area (Sq Ft)	Space					Coil					Coil Air Flow (Cfm)	Coil Sens. Load (Btuh)		
			Peak Time Mo/Hr	OA Cond. DB/WB (F)	Rm Dry Blb (F)	Supp. Dry Bulb (F)	Space Air Flow (Cfm)	Space Sens. Load (Btuh)	Peak Time Mo/Hr	OA Cond. DB/WB (F)	Rm Dry Blb (F)	Supp. Dry Bulb (F)				
1	KITCHEN	648	13/ 1	3	1	70	73.1	4,686	-15,343	13/ 1	3	1	70	73.1	4,686	-226,883
Zone	1 Total/Ave.	648		3	1	70	73.1	4,686	-15,343		3	1	70	73.1	4,686	-226,883
Zone	1 Block	648	13/ 1	3	1	70	73.1	4,686	-15,343	13/ 1	3	1	70	73.1	4,686	-226,883
System	1 Total/Ave.	648		3	1	70	73.1	4,686	-15,343		3	1	70	73.1	4,686	-226,883
System	1 Block	648	13/ 1	3	1	70	73.1	4,686	-15,343	13/ 1	3	1	70	73.1	4,686	-226,883
2	WAREHOUSE SUPPLY	4,728	13/ 1	3	1	67	136.3	1,480	-108,963	13/ 1	3	1	67	136.3	1,480	-108,332
Zone	2 Total/Ave.	4,728		3	1	67	136.3	1,480	-108,963		3	1	67	136.3	1,480	-108,332
Zone	2 Block	4,728	13/ 1	3	1	67	136.3	1,480	-108,963	13/ 1	3	1	67	136.3	1,480	-108,332
System	2 Total/Ave.	4,728		3	1	67	136.3	1,480	-108,963		3	1	67	136.3	1,480	-108,332
System	2 Block	4,728	13/ 1	3	1	67	136.3	1,480	-108,963	13/ 1	3	1	67	136.3	1,480	-108,332
3	CLASSROOMS	4,357	13/ 1	3	1	70	83.4	3,080	-43,757	13/ 1	3	1	70	83.4	3,080	-82,346
Zone	3 Total/Ave.	4,357		3	1	70	83.4	3,080	-43,757		3	1	70	83.4	3,080	-82,346
Zone	3 Block	4,357	13/ 1	3	1	70	83.4	3,080	-43,757	13/ 1	3	1	70	83.4	3,080	-82,346
System	3 Total/Ave.	4,357		3	1	70	83.4	3,080	-43,757		3	1	70	83.4	3,080	-82,346
System	3 Block	4,357	13/ 1	3	1	70	83.4	3,080	-43,757	13/ 1	3	1	70	83.4	3,080	-82,346
4	ASSEMBLY HALL	2,232	13/ 1	3	1	70	76.3	3,720	-24,711	13/ 1	3	1	70	76.3	3,720	-67,708
Zone	4 Total/Ave.	2,232		3	1	70	76.3	3,720	-24,711		3	1	70	76.3	3,720	-67,708
Zone	4 Block	2,232	13/ 1	3	1	70	76.3	3,720	-24,711	13/ 1	3	1	70	76.3	3,720	-67,708
System	4 Total/Ave.	2,232		3	1	70	76.3	3,720	-24,711		3	1	70	76.3	3,720	-67,708
System	4 Block	2,232	13/ 1	3	1	70	76.3	3,720	-24,711	13/ 1	3	1	70	76.3	3,720	-67,708
5	ADMINISTRATION	5,712	13/ 1	3	1	70	86.2	3,800	-65,514	13/ 1	3	1	70	86.2	3,800	-86,474
Zone	5 Total/Ave.	5,712		3	1	70	86.2	3,800	-65,514		3	1	70	86.2	3,800	-86,474
Zone	5 Block	5,712	13/ 1	3	1	70	86.2	3,800	-65,514	13/ 1	3	1	70	86.2	3,800	-86,474
System	5 Total/Ave.	5,712		3	1	70	86.2	3,800	-65,514		3	1	70	86.2	3,800	-86,474
System	5 Block	5,712	13/ 1	3	1	70	86.2	3,800	-65,514	13/ 1	3	1	70	86.2	3,800	-86,474

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- INTERNAL COOLING LOADS -----  
(At time of Coil Peak)

Room Number	Description	Lights		People	People	People	Misc. Space	Misc. Space	Misc.		Total (Btuh)
		Sensible (Btuh)	Ret. Air Lites (Btuh) CLF	Sensible (Btuh)	Latent (Btuh)	CLF	Sensible (Btuh)	Latent (Btuh)	Ret. Air (Btuh)	Misc. CLF	
3	CLASSROOMS	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
Zone	3 Total/Ave.	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
Zone	3 Block	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
System	3 Total/Ave.	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
System	3 Block	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
5	ADMINISTRATION	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
Zone	5 Total/Ave.	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
Zone	5 Block	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
System	5 Total/Ave.	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
System	5 Block	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- INTERNAL COOLING LOADS -----  
(At time of Space Peak)

Room Number	Description	Lights		People	People	People	Misc. Space	Misc. Space	Misc.		Total (Btuh)
		Sensible (Btuh)	Ret. Air Lites (Btuh) CLF	Sensible (Btuh)	Latent (Btuh)	CLF	Sensible (Btuh)	Latent (Btuh)	Ret. Air (Btuh)	Misc. CLF	
3	CLASSROOMS	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
Zone	3 Total/Ave.	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
Zone	3 Block	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
System	3 Total/Ave.	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
System	3 Block	27,086	0 1.000	11,760	7,440	1.000	192	0	0 0.500		46,477
5	ADMINISTRATION	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
Zone	5 Total/Ave.	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
Zone	5 Block	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
System	5 Total/Ave.	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549
System	5 Block	51,099	0 1.000	12,500	10,000	1.000	12,950	0	0 0.890		86,549

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----													
(Roof - Skylight)													
(At time of Coil Peak)													
		Roof		Roof				Skylight		Skylight			
		Return Air	Roof	Space	Roof	Skylight	Skylight	Skylt	Return Air	Skylt	Space	Skylt	
		Sensible	R.A.	Sensible	Space	Return Air	Space	Solar	Conduction	R.A.	Conduction	Space	
Room		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Load	CLTD	Load	CLTD	
Number	Description	(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	
3	CLASSROOMS	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	3 Total/Ave.	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	3 Block	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
System	3 Total/Ave.	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
System	3 Block	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
5	ADMINISTRATION	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	5 Total/Ave.	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	5 Block	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
System	5 Total/Ave.	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
System	5 Block	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	

----- BUILDING ENVELOPE COOLING LOADS -----												
(Wall - Window)												
(At time of Coil Peak)												
		Wall	Wall	Wall	Wall	Glass	Glass	Glass	Glass	Glass	Glass	Glass
		Plenum	Plenn	Space	Space	Space	Return Air	Solar	Space	Space	Return Air	R.A.
Room		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Conduction	CLTD	Conduction	CLTD
Number	Description	(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)
3	CLASSROOMS	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0
Zone	3 Total/Ave.	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0
Zone	3 Block	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0
System	3 Total/Ave.	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0
System	3 Block	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0
5	ADMINISTRATION	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0
Zone	5 Total/Ave.	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0
Zone	5 Block	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0
System	5 Total/Ave.	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0
System	5 Block	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0

----- BUILDING ENVELOPE COOLING LOADS -----										
(Exposed Floor - Partitions - Infiltration)										
(At time of Coil Peak)										
Room Number	Description	Exposed		Expad		Part.	Infilt.	Infilt.	Infilt.	Envelope
		Floor	Floor	Partition	Part.					
		Sensible	CLTD	Sensible	CLTD	Airflow	Sensible	Latent	Dry B	Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)
3	CLASSROOMS	0	0.0	0	0.0	214	4,318	7,355	75.0	25,596
Zone	3 Total/Ave.	0	0.0	0	0.0	214	4,318	7,355	75.0	25,596
Zone	3 Block	0	0.0	0	0.0	214	4,318	7,355	75.0	25,596
System	3 Total/Ave.	0	0.0	0	0.0	214	4,318	7,355	75.0	25,596

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
System	3 Block	0	0.0	0	0.0	214	4,318	7,355	75.0	0	25,596
	5 ADMINISTRATION	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
Zone	5 Total/Ave.	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
Zone	5 Block	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
System	5 Total/Ave.	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
System	5 Block	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717



COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----													
(Roof - Skylight)													
(At time of Space Peak)													
Room Number	Description	Roof		Roof		Skylight		Skylt CLF	Skylight		Skylight		Skylt CLTD
		Return Air Sensible Load (Btuh)	Roof R.A. CLTD (F)	Space Sensible Load (Btuh)	Roof Space CLTD (F)	Return Air Solar (Btuh)	Space Solar (Btuh)		Return Air Conduction Load (Btuh)	Skylt R.A. CLTD (F)	Space Conduction Load (Btuh)	Skylt Space CLTD (F)	
3	CLASSROOMS	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	3 Total/Ave.	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	3 Block	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
System	3 Total/Ave.	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
System	3 Block	0	0.0	7,418	68.1	0	0	0.000	0	0.0	0	0.0	
5	ADMINISTRATION	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	5 Total/Ave.	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
Zone	5 Block	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
System	5 Total/Ave.	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	
System	5 Block	0	0.0	9,725	68.1	0	0	0.000	0	0.0	0	0.0	

----- BUILDING ENVELOPE COOLING LOADS -----													
(Wall - Window)													
(At time of Space Peak)													
Room Number	Description	Wall		Wall		Glass		Glass CLF	Glass		Glass		Glass CLTD
		Plenum Load (Btuh)	Plenum CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)		Space Conduction (Btuh)	Plenum CLTD (F)	Return Air Conduction (Btuh)	Space R.A. CLTD (F)	
3	CLASSROOMS	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0	
Zone	3 Total/Ave.	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0	
Zone	3 Block	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0	
System	3 Total/Ave.	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0	
System	3 Block	0	0.0	2,346	12.3	3,360	0	0.700	799	18.4	0	0.0	
5	ADMINISTRATION	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0	
Zone	5 Total/Ave.	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0	
Zone	5 Block	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0	
System	5 Total/Ave.	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0	
System	5 Block	0	0.0	5,030	20.5	7,688	0	0.340	2,829	18.4	0	0.0	

----- BUILDING ENVELOPE COOLING LOADS -----											
(Exposed Floor - Partitions - Infiltration)											
(At time of Space Peak)											
Room Number	Description	Exposed		Partitions		Infiltr.	Infiltr.	Infiltr.	Dry B	Ceiling	Envelope
		Floor Sensible (Btuh)	Expsd Floor CLTD (F)	Partition Sensible (Btuh)	Part. CLTD (F)					Sensible Load (Btuh)	
3	CLASSROOMS	0	0.0	0	0.0	214	4,318	7,355	75.0	0	25,596
Zone	3 Total/Ave.	0	0.0	0	0.0	214	4,318	7,355	75.0	0	25,596
Zone	3 Block	0	0.0	0	0.0	214	4,318	7,355	75.0	0	25,596
System	3 Total/Ave.	0	0.0	0	0.0	214	4,318	7,355	75.0	0	25,596

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
 BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----  
 (Exposed Floor - Partitions - Infiltration)  
 (At time of Space Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
System	3 Block	0	0.0	0	0.0	214	4,318	7,355	75.0	0	25,596
5	ADMINISTRATION	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
Zone	5 Total/Ave.	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
Zone	5 Block	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
System	5 Total/Ave.	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717
System	5 Block	0	0.0	0	0.0	296	5,973	13,472	75.0	0	44,717

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----

(Roof - Skylight)

(At time of Coil Peak)

Room Number	Description	Roof		Roof		Skylight		Skylight		Skylight		Skylight	
		Return Air Sensible Load	Roof R.A. CLTD	Space Sensible Load	Roof Space CLTD	Return Air Solar	Skylight Space Solar	Skyt Solar CLF	Return Air Conduction Load	Skyt R.A. CLTD	Conduction Load	Space Load	Skyt Space CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	
1	KITCHEN	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	1 Total/Ave.	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	1 Block	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	1 Total/Ave.	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	1 Block	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0.0	0
2	WAREHOUSE SUPPLY	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0.0	0
Zone	2 Total/Ave.	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0.0	0
Zone	2 Block	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0.0	0
System	2 Total/Ave.	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0.0	0
System	2 Block	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0.0	0
3	CLASSROOMS	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	3 Total/Ave.	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	3 Block	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	3 Total/Ave.	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	3 Block	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0.0	0
4	ASSEMBLY HALL	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	4 Total/Ave.	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	4 Block	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	4 Total/Ave.	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	4 Block	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0.0	0
5	ADMINISTRATION	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	5 Total/Ave.	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0.0	0
Zone	5 Block	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	5 Total/Ave.	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0.0	0
System	5 Block	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0.0	0

----- BUILDING ENVELOPE HEATING LOADS -----

(Wall - Window)

(At time of Coil Peak)

Room Number	Description	Wall		Wall		Glass		Glass		Glass		Glass	
		Plenum Load	Wall CLTD	Space Load	Wall CLTD	Space Solar	Return Air Solar	Glass Solar CLF	Plenum Conduction	Glass Space CLTD	Return Air Conduction	Glass R.A. CLTD	
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	
1	KITCHEN	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0.0	0
Zone	1 Total/Ave.	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0.0	0
Zone	1 Block	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0.0	0
System	1 Total/Ave.	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0.0	0
System	1 Block	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0.0	0
2	WAREHOUSE SUPPLY	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0.0	0
Zone	2 Total/Ave.	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0.0	0
Zone	2 Block	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0.0	0
System	2 Total/Ave.	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0.0	0

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Wall - Window)  
(At time of Coil Peak)

Room Number	Description	Wall Plenum Load	Wall Plenum CLTD	Wall Space Load	Wall Space CLTD	Glass Space Solar	Glass Return Air Solar	Glass Solar CLF	Glass Space Conduction	Glass Space CLTD	Glass Return Air Conduction	Glass R.A. CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)
System	2 Block	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0.0
3	CLASSROOMS	0	0.0	-12,781	-67.0	0	0	0.000	-3,064	-67.0	0	0.0
Zone	3 Total/Ave.	0	0.0	-12,781	-67.0	0	0	0.000	-3,064	-67.0	0	0.0
Zone	3 Block	0	0.0	-12,781	-67.0	0	0	0.000	-3,064	-67.0	0	0.0
System	3 Total/Ave.	0	0.0	-12,781	-67.0	0	0	0.000	-3,064	-67.0	0	0.0
System	3 Block	0	0.0	-12,781	-67.0	0	0	0.000	-3,064	-67.0	0	0.0
4	ASSEMBLY HALL	0	0.0	-8,375	-67.0	0	0	0.000	-263	-67.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-8,375	-67.0	0	0	0.000	-263	-67.0	0	0.0
Zone	4 Block	0	0.0	-8,375	-67.0	0	0	0.000	-263	-67.0	0	0.0
System	4 Total/Ave.	0	0.0	-8,375	-67.0	0	0	0.000	-263	-67.0	0	0.0
System	4 Block	0	0.0	-8,375	-67.0	0	0	0.000	-263	-67.0	0	0.0
5	ADMINISTRATION	0	0.0	-16,441	-67.0	0	0	0.000	-10,855	-67.0	0	0.0
Zone	5 Total/Ave.	0	0.0	-16,441	-67.0	0	0	0.000	-10,855	-67.0	0	0.0
Zone	5 Block	0	0.0	-16,441	-67.0	0	0	0.000	-10,855	-67.0	0	0.0
System	5 Total/Ave.	0	0.0	-16,441	-67.0	0	0	0.000	-10,855	-67.0	0	0.0
System	5 Block	0	0.0	-16,441	-67.0	0	0	0.000	-10,855	-67.0	0	0.0

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible	Exposed Floor CLTD	Partition Sensible	Partition CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
1	KITCHEN	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
Zone	1 Total/Ave.	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
Zone	1 Block	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
System	1 Total/Ave.	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
System	1 Block	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
2	WAREHOUSE SUPPLY	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
Zone	2 Total/Ave.	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
Zone	2 Block	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
System	2 Total/Ave.	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
System	2 Block	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
3	CLASSROOMS	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
Zone	3 Total/Ave.	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
Zone	3 Block	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
System	3 Total/Ave.	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
System	3 Block	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
4	ASSEMBLY HALL	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
Zone	4 Total/Ave.	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
Zone	4 Block	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
 BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)

(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible	Exped Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
System	4 Total/Ave.	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
System	4 Block	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
	5 ADMINISTRATION	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
Zone	5 Total/Ave.	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
Zone	5 Block	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
System	5 Total/Ave.	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
System	5 Block	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----

(Roof - Skylight)

(At time of Space Peak)

Room Number	Description	Roof		Roof		Skylight		Skylt Solar CLF	Skylight		Skylt R.A. CLTD	Skylight	
		Return Air Sensible Load (Btuh)	Roof R.A. CLTD (F)	Space Sensible Load (Btuh)	Roof Space CLTD (F)	Return Air Solar (Btuh)	Space Solar (Btuh)		Return Air Conduction (Btuh)	Skylt Load (F)		Space Conduction (Btuh)	Skylt Space CLTD (F)
1	KITCHEN	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	1 Total/Ave.	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	1 Block	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	1 Total/Ave.	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	1 Block	0	0.0	-1,085	-67.0	0	0	0.000	0	0.0	0	0	0.0
2	WAREHOUSE SUPPLY	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0	0.0
Zone	2 Total/Ave.	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0	0.0
Zone	2 Block	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0	0.0
System	2 Total/Ave.	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0	0.0
System	2 Block	0	0.0	-38,430	-64.0	0	0	0.000	0	0.0	0	0	0.0
3	CLASSROOMS	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	3 Total/Ave.	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	3 Block	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	3 Total/Ave.	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	3 Block	0	0.0	-7,298	-67.0	0	0	0.000	0	0.0	0	0	0.0
4	ASSEMBLY HALL	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	4 Total/Ave.	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	4 Block	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	4 Total/Ave.	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	4 Block	0	0.0	-3,739	-67.0	0	0	0.000	0	0.0	0	0	0.0
5	ADMINISTRATION	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	5 Total/Ave.	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0	0.0
Zone	5 Block	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	5 Total/Ave.	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0	0.0
System	5 Block	0	0.0	-9,568	-67.0	0	0	0.000	0	0.0	0	0	0.0

----- BUILDING ENVELOPE HEATING LOADS -----

(Wall - Window)

(At time of Space Peak)

Room Number	Description	Wall		Wall		Glass		Glass Solar CLF	Glass		Glass Return Air CLTD	Glass	
		Plenum Load (Btuh)	Plenum CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)		Space Conduction (Btuh)	Glass CLTD (F)		Return Air Conduction (Btuh)	Glass R.A. CLTD (F)
1	KITCHEN	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0	0.0
Zone	1 Total/Ave.	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0	0.0
Zone	1 Block	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0	0.0
System	1 Total/Ave.	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0	0.0
System	1 Block	0	0.0	-5,975	-67.0	0	0	0.000	-263	-67.0	0	0	0.0
2	WAREHOUSE SUPPLY	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0	0.0
Zone	2 Total/Ave.	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0	0.0
Zone	2 Block	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0	0.0
System	2 Total/Ave.	0	0.0	-28,149	-64.0	0	0	0.000	-1,507	-64.0	0	0	0.0

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----											
(Wall - Window)											
(At time of Space Peak)											
Room		Wall	Wall	Wall	Wall	Glass	Glass	Glass	Glass	Glass	Glass
Number	Description	Plenum	Plenum	Space	Space	Space	Return Air	Solar	CLF	Conduction	R.A.
		Load	CLTD	Load	CLTD	Solar	Solar	CLF		CLTD	CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)			(Btuh)	(F)
System	2 Block	0	0.0	-28,149	-64.0	0	0	0.000		-1,507	-64.0
3	CLASSROOMS	0	0.0	-12,781	-67.0	0	0	0.000		-3,064	-67.0
Zone	3 Total/Ave.	0	0.0	-12,781	-67.0	0	0	0.000		-3,064	-67.0
Zone	3 Block	0	0.0	-12,781	-67.0	0	0	0.000		-3,064	-67.0
System	3 Total/Ave.	0	0.0	-12,781	-67.0	0	0	0.000		-3,064	-67.0
System	3 Block	0	0.0	-12,781	-67.0	0	0	0.000		-3,064	-67.0
4	ASSEMBLY HALL	0	0.0	-8,375	-67.0	0	0	0.000		-263	-67.0
Zone	4 Total/Ave.	0	0.0	-8,375	-67.0	0	0	0.000		-263	-67.0
Zone	4 Block	0	0.0	-8,375	-67.0	0	0	0.000		-263	-67.0
System	4 Total/Ave.	0	0.0	-8,375	-67.0	0	0	0.000		-263	-67.0
System	4 Block	0	0.0	-8,375	-67.0	0	0	0.000		-263	-67.0
5	ADMINISTRATION	0	0.0	-16,441	-67.0	0	0	0.000		-10,855	-67.0
Zone	5 Total/Ave.	0	0.0	-16,441	-67.0	0	0	0.000		-10,855	-67.0
Zone	5 Block	0	0.0	-16,441	-67.0	0	0	0.000		-10,855	-67.0
System	5 Total/Ave.	0	0.0	-16,441	-67.0	0	0	0.000		-10,855	-67.0
System	5 Block	0	0.0	-16,441	-67.0	0	0	0.000		-10,855	-67.0

----- BUILDING ENVELOPE HEATING LOADS -----											
(Exposed Floor - Partitions - Infiltration)											
(At time of Space Peak)											
Room		Exposed	Expsd	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope
Number	Description	Sensible	CLTD	Sensible	CLTD	Airflow	Sensible	Latent	Dry B	Sensible	Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
1	KITCHEN	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
Zone	1 Total/Ave.	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
Zone	1 Block	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
System	1 Total/Ave.	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
System	1 Block	-1,616	-67.0	0	0.0	90	-6,404	0	70.0	0	-15,343
2	WAREHOUSE SUPPLY	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
Zone	2 Total/Ave.	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
Zone	2 Block	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
System	2 Total/Ave.	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
System	2 Block	-11,106	-64.0	0	0.0	438	-29,772	0	67.0	0	-108,963
3	CLASSROOMS	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
Zone	3 Total/Ave.	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
Zone	3 Block	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
System	3 Total/Ave.	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
System	3 Block	-5,387	-67.0	0	0.0	214	-15,228	0	70.0	0	-43,757
4	ASSEMBLY HALL	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
Zone	4 Total/Ave.	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
Zone	4 Block	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
System	4 Total/Ave.	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
System	4 Block	-1,661	-67.0	0	0.0	150	-10,674	0	70.0	0	-24,711
	5 ADMINISTRATION	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
Zone	5 Total/Ave.	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
Zone	5 Block	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
System	5 Total/Ave.	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514
System	5 Block	-7,586	-67.0	0	0.0	296	-21,063	0	70.0	0	-65,514



COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- AIRFLOW COOLING LOADS -----  
(At time of Coil Peak)

		----- Ventilation -----			----- Optional Ventilation -----			----- Bypass -----			Ov/Undr Sizing (Btuh)
Room Number	Description	Airflow (Cfm)	Sensible (Btuh)	Latent Airflow (Btuh)	Airflow (Cfm)	Sensible (Btuh)	Latent Airflow (Btuh)	Airflow (Cfm)	Sensible (Btuh)	Latent (Btuh)	
3	CLASSROOMS	600	12,108	20,620	0	0	0	0	0	0	0
Zone	3 Total/Ave.	600	12,108	20,620	0	0	0	0	0	0	0
Zone	3 Block	600	12,108	20,620	0	0	0	0	0	0	0
System	3 Total/Ave.	600	12,108	20,620	0	0	0	0	0	0	0
System	3 Block	600	12,108	20,620	0	0	0	0	0	0	-6,090
5	ADMINISTRATION	380	7,668	17,295	0	0	0	0	0	0	-6,090
Zone	5 Total/Ave.	380	7,668	17,295	0	0	0	0	0	0	-6,090
Zone	5 Block	380	7,668	17,295	0	0	0	0	0	0	-6,090
System	5 Total/Ave.	380	7,668	17,295	0	0	0	0	0	0	-6,090
System	5 Block	380	7,668	17,295	0	0	0	0	0	0	-6,090

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

AIRFLOW HEATING LOADS

(At time of Coil Peak)

		--- Ventilation --		Op. Vent.----		Reheat -----		Humidif. ----		Total
Room	Description	Airflow	Sensible	Airflow	Sensible	Airflow	Sensible	Airflow	Latent	
Number		(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Btuh)
1	KITCHEN	3,036	-216,038	0	0	0	0	0	0	-216,038
Zone	1 Total/Ave.	3,036	-216,038	0	0	0	0	0	0	-216,038
Zone	1 Block	3,036	-216,038	0	0	0	0	0	0	-216,038
System	1 Total/Ave.	3,036	-216,038	0	0	0	0	0	0	-216,038
System	1 Block	3,036	-216,038	0	0	0	0	0	0	-216,038
2	WAREHOUSE SUPPLY	0	0	0	0	0	0	0	0	0
Zone	2 Total/Ave.	0	0	0	0	0	0	0	0	0
Zone	2 Block	0	0	0	0	0	0	0	0	0
System	2 Total/Ave.	0	0	0	0	0	0	0	0	0
System	2 Block	0	0	0	0	0	0	0	0	0
3	CLASSROOMS	600	-42,695	0	0	0	0	0	0	-42,695
Zone	3 Total/Ave.	600	-42,695	0	0	0	0	0	0	-42,695
Zone	3 Block	600	-42,695	0	0	0	0	0	0	-42,695
System	3 Total/Ave.	600	-42,695	0	0	0	0	0	0	-42,695
System	3 Block	600	-42,695	0	0	0	0	0	0	-42,695
4	ASSEMBLY HALL	660	-46,965	0	0	0	0	0	0	-46,965
Zone	4 Total/Ave.	660	-46,965	0	0	0	0	0	0	-46,965
Zone	4 Block	660	-46,965	0	0	0	0	0	0	-46,965
System	4 Total/Ave.	660	-46,965	0	0	0	0	0	0	-46,965
System	4 Block	660	-46,965	0	0	0	0	0	0	-46,965
5	ADMINISTRATION	380	-27,040	0	0	0	0	0	0	-27,040
Zone	5 Total/Ave.	380	-27,040	0	0	0	0	0	0	-27,040
Zone	5 Block	380	-27,040	0	0	0	0	0	0	-27,040
System	5 Total/Ave.	380	-27,040	0	0	0	0	0	0	-27,040
System	5 Block	380	-27,040	0	0	0	0	0	0	-27,040

COOLING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- AIRFLOW HEAT GAIN AND LOSS -----  
(At time of Coil Peak)

Room Number	Description	Duct Heat Pickup (Btuh)	Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	Cooling							
						System Exhaust (Btuh)	Room Exhaust (Cfm)	Room Exhaust (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around Airflow (Cfm)	Corridor Airflow (Cfm)	System Return Airflow (Cfm)
3	CLASSROOMS	0	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
Zone	3 Total/Ave.	0	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
Zone	3 Block	0	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
System	3 Total/Ave.	0	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
System	3 Block	0	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
5	ADMINISTRATION	0	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
Zone	5 Total/Ave.	0	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
Zone	5 Block	0	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
System	5 Total/Ave.	0	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
System	5 Block	0	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800

HEATING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- A I R F L O W H E A T G A I N A N D L O S S -----  
(At time of Coil Peak)

Room Number	Description	Heating										System Return Airflow (Cfm)
		Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	Total (Btuh)	System Exhaust Airflow (Cfm)	Room Exhaust Airflow (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around Airflow (Cfm)	Corridor Airflow (Cfm)	
1	KITCHEN	4,499	0	0	4,499	3,036	0	0	0	0	0	4,686
Zone	1 Total/Ave.	4,499	0	0	4,499	3,036	0	0	0	0	0	4,686
Zone	1 Block	4,499	0	0	4,499	3,036	0	0	0	0	0	4,686
System	1 Total/Ave.	4,499	0	0	4,499	3,036	0	0	0	0	0	4,686
System	1 Block	4,499	0	0	4,499	3,036	0	0	0	0	0	4,686
2	WAREHOUSE SUPPLY	631	0	0	631	0	0	0	0	0	0	1,480
Zone	2 Total/Ave.	631	0	0	631	0	0	0	0	0	0	1,480
Zone	2 Block	631	0	0	631	0	0	0	0	0	0	1,480
System	2 Total/Ave.	631	0	0	631	0	0	0	0	0	0	1,480
System	2 Block	631	0	0	631	0	0	0	0	0	0	1,480
3	CLASSROOMS	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
Zone	3 Total/Ave.	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
Zone	3 Block	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
System	3 Total/Ave.	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
System	3 Block	4,107	0	0	4,107	600	0	3,080	0	0	0	3,080
4	ASSEMBLY HALL	3,968	0	0	3,968	660	0	0	0	0	0	3,720
Zone	4 Total/Ave.	3,968	0	0	3,968	660	0	0	0	0	0	3,720
Zone	4 Block	3,968	0	0	3,968	660	0	0	0	0	0	3,720
System	4 Total/Ave.	3,968	0	0	3,968	660	0	0	0	0	0	3,720
System	4 Block	3,968	0	0	3,968	660	0	0	0	0	0	3,720
5	ADMINISTRATION	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
Zone	5 Total/Ave.	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
Zone	5 Block	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
System	5 Total/Ave.	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800
System	5 Block	6,080	0	0	6,080	380	0	3,800	0	0	0	3,800

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 1350 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C S T A T E P O I N T S -----

Zone 3

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	63.3	53.2	72.6	29.3	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	63.3	53.2	72.6	29.3	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	78.7	66.4	53.4	82.6	31.8	
Blow through Fan						0.0
Entering Coil	78.7	66.4	53.4	82.6	31.8	
Leaving Coil	56.2	55.0	92.6	65.7	23.7	
Draw Through Fan						0.3
Duct Frictional Heat						0.9
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	57.5	55.4	88.5	65.7	24.0	
Supply Air	57.5	55.4	88.5	65.7	24.0	
Percent Outside Air		19.48	(%)			
Sensible Heat Ratio (SHR)		0.788				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		3,080	(Cfm)			

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C   S T A T E   P O I N T S -----

Zone        5

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	59.7	41.1	55.9	26.7	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	59.7	41.1	55.9	26.7	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	76.9	61.8	43.2	62.7	28.3	
Blow through Fan						0.0
Entering Coil	76.9	61.8	43.2	62.7	28.3	
Leaving Coil	48.3	47.1	92.4	48.7	19.1	
Draw Through Fan						0.4
Duct Frictional Heat						1.1
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	49.8	47.8	87.3	48.7	19.5	
Supply Air	49.8	47.8	87.3	48.7	19.5	
Percent Outside Air		10.00	(%)			
Sensible Heat Ratio (SHR)		0.829				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		3,800	(Cfm)			

BUILDING U-VALUES - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	----- Room U-Values ----- (Btu/hr/sqft/F)									Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
		Part.	ExFlr	Summr Skylt	Wintr Skylt	Summr Roof	Wintr Windo	Summr Windo	Wall	Cell.		
1	KITCHEN	0.000	0.670	0.000	0.000	0.025	0.620	0.654	0.117	0.000	70.3	14.71
Zone	1 Total/Ave.	0.000	0.670	0.000	0.000	0.025	0.620	0.654	0.117	0.000	70.3	14.71
System	1 Total/Ave.	0.000	0.670	0.000	0.000	0.025	0.620	0.654	0.117	0.000	70.3	14.71
2	WAREHOUSE SUPPLY	0.388	0.670	0.000	0.000	0.127	0.620	0.654	0.118	0.000	69.3	14.52
Zone	2 Total/Ave.	0.388	0.670	0.000	0.000	0.127	0.620	0.654	0.118	0.000	69.3	14.52
System	2 Total/Ave.	0.388	0.670	0.000	0.000	0.127	0.620	0.654	0.118	0.000	69.3	14.52
3	CLASSROOMS	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.115	0.000	58.9	12.43
Zone	3 Total/Ave.	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.115	0.000	58.9	12.43
System	3 Total/Ave.	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.115	0.000	58.9	12.43
4	ASSEMBLY HALL	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.121	0.000	49.9	10.63
Zone	4 Total/Ave.	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.121	0.000	49.9	10.63
System	4 Total/Ave.	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.121	0.000	49.9	10.63
5	ADMINISTRATION	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.114	0.000	60.2	12.70
Zone	5 Total/Ave.	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.114	0.000	60.2	12.70
System	5 Total/Ave.	0.388	0.670	0.000	0.000	0.025	0.620	0.654	0.114	0.000	60.2	12.70
Building		0.388	0.670	0.000	0.000	0.052	0.620	0.654	0.117	0.000	61.4	12.93

BUILDING AREAS - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)		Partition Area (sqft)	Exposed Floor Area (sqft)		Skylight Area (sqft)	SkI /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /Wl (%)	Net Wall Area (sqft)
		Fir	Rm		Floor	Area		Floor	Area						
1	KITCHEN	1	1	648	648	0	36	0	0	648	6	1	759		
Zone	1 Total/Ave.				648	0	36	0	0	648	6	1	759		
System	1 Total/Ave.				648	0	36	0	0	648	6	1	759		
2	WAREHOUSE SUPPLY	1	1	4,728	4,728	5,700	259	0	0	4,728	36	1	3,716		
Zone	2 Total/Ave.				4,728	5,700	259	0	0	4,728	36	1	3,716		
System	2 Total/Ave.				4,728	5,700	259	0	0	4,728	36	1	3,716		
3	CLASSROOMS	1	1	4,357	4,357	7,520	120	0	0	4,357	70	4	1,652		
Zone	3 Total/Ave.				4,357	7,520	120	0	0	4,357	70	4	1,652		
System	3 Total/Ave.				4,357	7,520	120	0	0	4,357	70	4	1,652		
4	ASSEMBLY HALL	1	1	2,232	2,232	1,610	37	0	0	2,232	6	1	1,037		
Zone	4 Total/Ave.				2,232	1,610	37	0	0	2,232	6	1	1,037		
System	4 Total/Ave.				2,232	1,610	37	0	0	2,232	6	1	1,037		
5	ADMINISTRATION	1	1	5,712	5,712	10,490	169	0	0	5,712	248	10	2,160		
Zone	5 Total/Ave.				5,712	10,490	169	0	0	5,712	248	10	2,160		
System	5 Total/Ave.				5,712	10,490	169	0	0	5,712	248	10	2,160		
Building					17,677	25,320	621	0	0	17,677	366	4	9,324		

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.052 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.136 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.082 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.52 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 7.09 (Btu/Hr/Sq Ft)



Main System      1   UV                      UNIT VENTILATOR

Main System	2 UH	UNIT HEATERS
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Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.0	0	0	-5,417	16	201	74.0	0	0	0.0	0	0
5 - 10												
10 - 15												
15 - 20												
20 - 25												
25 - 30												
30 - 35												
35 - 40												
40 - 45												
45 - 50												
50 - 55												
55 - 60												
60 - 65												
65 - 70												
70 - 75												
75 - 80												
80 - 85												
85 - 90												
90 - 95												
95 - 100												
Hours Off												

Percent Design Load	----- Cooling Load -----			----- Heating Load -----			----- Cooling Airflow -----			----- Heating Airflow -----		
	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.0	0	0	-10,833	12	159	148.0	0	0	0.0	0	0
5 - 10	0.0	0	0	-16,250	7	95	222.0	0	0	0.0	0	0
10 - 15	0.0	0	0	-21,666	15	195	296.0	0	0	0.0	0	0
15 - 20	0.0	0	0	-27,083	20	265	370.0	0	0	0.0	0	0
20 - 25	0.0	0	0	-32,499	15	198	444.0	0	0	0.0	0	0
25 - 30	0.0	0	0	-37,916	14	182	518.0	0	0	0.0	0	0
30 - 35	0.0	0	0	-43,333	0	0	592.0	0	0	0.0	0	0
35 - 40	0.0	0	0	-48,749	0	0	666.0	0	0	0.0	0	0
40 - 45	0.0	0	0	-54,166	0	0	740.0	0	0	0.0	0	0
45 - 50	0.0	0	0	-59,582	0	0	814.0	0	0	0.0	0	0
50 - 55	0.0	0	0	-64,999	0	0	888.0	0	0	0.0	0	0
55 - 60	0.0	0	0	-70,416	0	0	962.0	0	0	0.0	0	0
60 - 65	0.0	0	0	-75,832	0	0	1,036.0	0	0	0.0	0	0
65 - 70	0.0	0	0	-81,249	0	0	1,110.0	0	0	0.0	0	0
70 - 75	0.0	0	0	-86,665	0	0	1,184.0	0	0	0.0	0	0
75 - 80	0.0	0	0	-92,082	0	0	1,258.0	0	0	0.0	0	0
80 - 85	0.0	0	0	-97,498	0	0	1,332.0	0	0	0.0	0	0
85 - 90	0.0	0	0	-102,915	0	0	1,406.0	0	0	0.0	0	0
90 - 95	0.0	0	0	-108,332	0	0	1,480.0	100	8,760	0.0	0	0
95 - 100	0.0	0	8,760	0	0	7,465	0.0	0	0	0.0	0	8,760

BLDG 1350      BASERUN      FT LEONARD WOOD

Main System 3 SZ SINGLE ZONE

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.5	11	266	-4,357	11	164	154.0	0	0	0.0	0	0
5 - 10	1.0	7	176	-8,715	12	180	308.0	0	0	0.0	0	0
10 - 15	1.5	10	246	-13,073	12	181	462.0	0	0	0.0	0	0
15 - 20	2.0	7	163	-17,430	7	105	616.0	0	0	0.0	0	0
20 - 25	2.5	9	208	-21,787	15	213	770.0	0	0	0.0	0	0
25 - 30	3.0	7	181	-26,145	30	437	924.0	0	0	0.0	0	0
30 - 35	3.5	8	206	-30,503	13	186	1,078.0	0	0	0.0	0	0
35 - 40	4.0	10	249	-34,860	0	0	1,232.0	0	0	0.0	0	0
40 - 45	4.5	8	203	-39,218	0	0	1,386.0	0	0	0.0	0	0
45 - 50	5.0	6	147	-43,575	0	0	1,540.0	0	0	0.0	0	0
50 - 55	5.5	4	107	-47,933	0	0	1,694.0	0	0	0.0	0	0
55 - 60	6.0	4	85	-52,290	0	0	1,848.0	0	0	0.0	0	0
60 - 65	6.5	2	40	-56,648	0	0	2,002.0	0	0	0.0	0	0
65 - 70	7.0	2	45	-61,005	0	0	2,156.0	0	0	0.0	0	0
70 - 75	7.5	2	43	-65,363	0	0	2,310.0	0	0	0.0	0	0
75 - 80	8.0	2	42	-69,720	0	0	2,464.0	0	0	0.0	0	0
80 - 85	8.5	1	20	-74,078	0	0	2,618.0	0	0	0.0	0	0
85 - 90	9.1	0	0	-78,435	0	0	2,772.0	0	0	0.0	0	0
90 - 95	9.6	0	0	-82,793	0	0	2,926.0	0	0	0.0	0	0
95 - 100	10.1	0	0	-87,150	0	0	3,080.0	100	8,760	0.0	0	0
Hours Off	0.0	0	6,333	0	0	7,294	0.0	0	0	0.0	0	8,760

Main System      4   SZ      SINGLE ZONE

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.0	0	0	-3,385	11	266	186.0	0	0	0.0	0	0
5 - 10												
10 - 15												
15 - 20												
20 - 25												
25 - 30												
30 - 35												
35 - 40												
40 - 45												
45 - 50												
50 - 55												
55 - 60												
60 - 65												
65 - 70												
70 - 75												
75 - 80												
80 - 85												
85 - 90												
90 - 95												
95 - 100												
Hours Off												

BLDG 1350      BASERUN      FT LEONARD WOOD

[illegible]

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

Main System 5 SZ SINGLE ZONE

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.7	5	147	-5,658	30	82	190.0	0	0	0.0	0	0
5 - 10	1.3	15	466	-11,315	7	19	380.0	0	0	0.0	0	0
10 - 15	2.0	10	288	-16,972	63	172	570.0	0	0	0.0	0	0
15 - 20	2.6	6	189	-22,630	0	0	760.0	0	0	0.0	0	0
20 - 25	3.3	6	180	-28,288	0	0	950.0	0	0	0.0	0	0
25 - 30	3.9	4	112	-33,945	0	0	1,140.0	0	0	0.0	0	0
30 - 35	4.6	6	195	-39,603	0	0	1,330.0	0	0	0.0	0	0
35 - 40	5.2	6	176	-45,260	0	0	1,520.0	0	0	0.0	0	0
40 - 45	5.9	4	131	-50,918	0	0	1,710.0	0	0	0.0	0	0
45 - 50	6.5	6	169	-56,575	0	0	1,900.0	0	0	0.0	0	0
50 - 55	7.2	1	42	-62,233	0	0	2,090.0	0	0	0.0	0	0
55 - 60	7.8	6	176	-67,890	0	0	2,280.0	0	0	0.0	0	0
60 - 65	8.5	3	102	-73,548	0	0	2,470.0	0	0	0.0	0	0
65 - 70	9.1	5	150	-79,205	0	0	2,660.0	0	0	0.0	0	0
70 - 75	9.8	4	133	-84,863	0	0	2,850.0	0	0	0.0	0	0
75 - 80	10.4	4	127	-90,520	0	0	3,040.0	0	0	0.0	0	0
80 - 85	11.1	4	127	-96,178	0	0	3,230.0	0	0	0.0	0	0
85 - 90	11.7	2	63	-101,835	0	0	3,420.0	0	0	0.0	0	0
90 - 95	12.4	1	22	-107,493	0	0	3,610.0	0	0	0.0	0	0
95 - 100	13.0	1	20	-113,150	0	0	3,800.0	100	8,760	0.0	0	0
Hours Off	0.0	0	5,745	0	0	8,487	0.0	0	0	0.0	0	8,760

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	1.2	13	389	-32,762	10	456	838.3	0	0	0.0	0	0
5 - 10	2.3	12	365	-65,524	20	945	1,676.6	0	0	0.0	0	0
10 - 15	3.5	10	306	-98,286	26	1,201	2,514.9	0	0	0.0	0	0
15 - 20	4.6	5	158	-131,048	14	631	3,353.2	0	0	0.0	0	0
20 - 25	5.8	5	158	-163,810	11	512	4,191.5	0	0	0.0	0	0
25 - 30	6.9	7	210	-196,572	7	331	5,029.8	0	0	0.0	0	0
30 - 35	8.1	7	198	-229,334	7	349	5,868.1	0	0	0.0	0	0
35 - 40	9.2	5	144	-262,096	5	237	6,706.4	0	0	0.0	0	0
40 - 45	10.4	6	169	-294,858	0	0	7,544.7	0	0	0.0	0	0
45 - 50	11.5	5	149	-327,620	0	0	8,383.0	42	3,672	0.0	0	0
50 - 55	12.7	5	150	-360,382	0	0	9,221.3	0	0	0.0	0	0
55 - 60	13.8	5	150	-393,144	0	0	10,059.6	0	0	0.0	0	0
60 - 65	15.0	5	154	-425,906	0	0	10,897.9	0	0	0.0	0	0
65 - 70	16.2	2	60	-458,668	0	0	11,736.2	0	0	0.0	0	0
70 - 75	17.3	4	128	-491,430	0	0	12,574.5	0	0	0.0	0	0
75 - 80	18.5	1	42	-524,192	0	0	13,412.8	0	0	0.0	0	0
80 - 85	19.6	2	65	-556,954	0	0	14,251.1	0	0	0.0	0	0
85 - 90	20.8	0	0	-589,716	0	0	15,089.4	0	0	0.0	0	0
90 - 95	21.9	1	20	-622,478	0	0	15,927.7	0	0	0.0	0	0
95 - 100	23.1	0	0	-655,240	0	0	16,766.0	58	5,088	0.0	0	0
Hours Off	0.0	0	5,745	0	0	4,098	0.0	0	0	0.0	0	8,760

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

January			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	24.1	19.9	-225,746	0.0	-219,414	0.0	-227,618	0.0	-236,917	0.0	-236,917	0.0
2	23.4	19.5	-238,642	0.0	-238,998	0.0	-238,998	0.0	-254,911	0.0	-254,911	0.0
3	23.7	20.0	-255,278	0.0	-244,375	0.0	-244,375	0.0	-261,092	0.0	-261,092	0.0
4	24.7	21.1	-262,388	0.0	-240,062	0.0	-240,062	0.0	-256,021	0.0	-256,021	0.0
5	26.3	22.8	-268,040	0.0	-234,124	0.0	-234,124	0.0	-249,725	0.0	-249,725	0.0
6	28.3	25.0	-272,512	0.0	-230,472	0.0	-230,472	0.0	-243,735	0.0	-243,735	0.0
7	30.8	27.9	-258,088	0.0	-214,763	0.0	-216,186	0.0	-226,771	0.0	-226,771	0.0
8	33.5	30.8	-169,268	0.0	-142,683	0.0	-184,465	0.0	-184,465	0.0	-142,683	0.0
9	36.4	33.5	-145,341	0.0	-123,457	0.0	-162,359	0.0	-162,359	0.0	-123,457	0.0
10	39.3	35.6	-128,653	0.0	-114,164	0.0	-148,595	0.0	-148,595	0.0	-114,164	0.0
11	42.1	36.8	-110,019	0.0	-106,467	0.0	-137,073	0.0	-137,073	0.0	-106,467	0.0
12	44.6	37.5	-92,268	0.0	-100,312	0.0	-121,748	0.0	-121,748	0.0	-100,312	0.0
13	46.6	38.2	-63,306	0.0	-76,145	0.0	-93,989	0.0	-93,989	0.0	-76,145	0.0
14	48.2	38.3	-42,406	0.0	-55,017	0.0	-66,235	0.0	-66,235	0.0	-55,017	0.0
15	49.2	39.0	-47,585	0.0	-59,457	0.0	-67,020	0.0	-67,020	0.0	-59,457	0.0
16	49.5	39.1	-56,591	0.0	-65,240	0.0	-68,144	0.0	-68,144	0.0	-65,240	0.0
17	48.8	38.9	-70,418	0.0	-75,079	0.0	-76,938	0.0	-76,938	0.0	-75,079	0.0
18	47.0	38.5	-69,991	0.0	-70,953	0.0	-73,825	0.0	-73,825	0.0	-70,953	0.0
19	44.1	37.3	-67,641	0.0	-66,596	0.0	-74,409	0.0	-74,409	0.0	-66,596	0.0
20	40.5	34.8	-86,956	0.0	-86,198	0.0	-100,713	0.0	-100,713	0.0	-86,198	0.0
21	36.4	31.2	-109,873	0.0	-117,043	0.0	-139,972	0.0	-139,972	0.0	-117,043	0.0
22	32.4	27.7	-134,270	0.0	-141,771	0.0	-172,181	0.0	-172,181	0.0	-141,771	0.0
23	28.8	24.3	-145,427	0.0	-158,959	0.0	-196,554	0.0	-196,554	0.0	-158,959	0.0
24	25.9	21.7	-157,090	0.0	-171,590	0.0	-217,390	0.0	-217,390	0.0	-171,590	0.0

February			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	31.5	28.3	-200,058	0.0	-183,975	0.0	-181,401	0.0	-192,024	0.0	-192,024	0.0
2	29.8	26.8	-216,134	0.0	-200,025	0.0	-200,025	0.0	-200,025	0.0	-200,025	0.0
3	28.3	25.5	-224,754	0.0	-210,618	0.0	-210,618	0.0	-222,428	0.0	-222,428	0.0
4	27.1	24.4	-229,027	0.0	-220,025	0.0	-220,025	0.0	-232,757	0.0	-232,757	0.0
5	26.2	23.6	-233,770	0.0	-227,448	0.0	-227,448	0.0	-241,362	0.0	-241,362	0.0
6	25.6	23.5	-239,633	0.0	-237,778	0.0	-237,778	0.0	-252,171	0.0	-252,171	0.0
7	25.5	23.4	-246,182	0.0	-233,244	0.0	-233,244	0.0	-248,042	0.0	-248,042	0.0
8	26.2	24.4	-161,617	0.0	-176,974	0.0	-212,796	0.0	-221,455	0.0	-176,974	0.0
9	28.3	26.1	-139,326	0.0	-160,194	0.0	-207,144	0.0	-207,144	0.0	-160,194	0.0
10	31.5	28.7	-128,454	0.0	-150,083	0.0	-192,073	0.0	-192,073	0.0	-150,083	0.0
11	35.2	31.3	-114,888	0.0	-137,522	0.0	-173,407	0.0	-173,407	0.0	-137,522	0.0
12	39.0	33.9	-99,144	0.0	-124,208	0.0	-152,972	0.0	-152,972	0.0	-124,208	0.0
13	42.2	35.9	-75,702	0.0	-93,600	0.0	-115,256	0.0	-115,256	0.0	-93,600	0.0
14	44.3	36.9	-56,790	0.0	-68,429	0.0	-85,358	0.0	-85,358	0.0	-68,429	0.0
15	45.0	36.8	-62,381	0.0	-73,819	0.0	-83,699	0.0	-83,699	0.0	-73,819	0.0
16	44.8	36.3	-71,026	0.0	-82,715	0.0	-90,762	0.0	-90,762	0.0	-82,715	0.0
17	44.3	35.8	-82,809	0.0	-89,954	0.0	-98,740	0.0	-98,740	0.0	-89,954	0.0
18	43.4	35.6	-80,347	0.0	-83,026	0.0	-89,875	0.0	-89,875	0.0	-83,026	0.0
19	42.2	36.1	-75,075	0.0	-72,881	0.0	-83,245	0.0	-83,245	0.0	-72,881	0.0
20	40.7	35.9	-91,418	0.0	-90,110	0.0	-107,183	0.0	-107,183	0.0	-90,110	0.0
21	39.0	34.5	-123,206	0.0	-112,091	0.0	-135,258	0.0	-135,258	0.0	-112,091	0.0
22	37.1	33.2	-134,084	0.0	-122,416	0.0	-150,094	0.0	-150,094	0.0	-122,416	0.0
23	35.2	31.5	-143,151	0.0	-132,499	0.0	-164,681	0.0	-164,681	0.0	-132,499	0.0
24	33.3	29.9	-149,882	0.0	-146,278	0.0	-177,386	0.0	-177,386	0.0	-146,278	0.0

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

March			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton	
1	40.0	36.8	-155,866	0.0		-112,069	0.0		-112,069	0.0		-123,877	0.0		-123,877	0.0	
2	37.3	34.5	-175,470	0.0		-123,738	0.0		-123,739	0.0		-149,995	0.0		-149,995	0.0	
3	34.9	32.2	-185,559	0.0		-134,475	0.0		-134,475	0.0		-164,856	0.0		-164,856	0.0	
4	32.9	30.3	-191,809	0.0		-148,438	0.0		-149,982	0.0		-177,163	0.0		-177,163	0.0	
5	31.4	28.8	-193,971	0.0		-180,701	0.0		-192,060	0.0		-192,060	0.0		-192,060	0.0	
6	30.4	28.0	-205,107	0.0		-208,459	0.0		-208,459	0.0		-208,459	0.0		-208,459	0.0	
7	30.1	27.6	-191,606	0.0		-205,799	0.0		-205,799	0.0		-205,799	0.0		-205,799	0.0	
8	30.7	28.0	-125,368	0.0		-146,772	0.0		-177,970	0.0		-183,393	0.0		-146,772	0.0	
9	32.5	28.9	-100,557	0.0		-136,231	0.0		-170,220	0.0		-174,058	0.0		-136,231	0.0	
10	35.4	30.6	-83,535	0.0		-126,918	0.0		-161,922	0.0		-161,922	0.0		-126,918	0.0	
11	38.9	32.6	-67,719	0.0		-114,841	0.0		-145,414	0.0		-145,414	0.0		-114,841	0.0	
12	42.9	35.4	-61,798	0.0		-101,061	0.0		-123,841	0.0		-123,841	0.0		-101,061	0.0	
13	46.8	38.5	-41,557	0.0		-73,065	0.0		-86,366	0.0		-86,366	0.0		-73,065	0.0	
14	50.4	41.3	-20,864	0.0		-47,403	0.0		-51,804	0.0		-51,804	0.0		-47,403	0.0	
15	53.2	43.6	-25,778	0.0		-45,776	0.0		-45,776	0.0		-45,776	0.0		-45,776	0.0	
16	55.0	45.1	-35,073	0.0		-46,700	0.0		-46,700	0.0		-46,700	0.0		-46,700	0.0	
17	55.6	45.4	-48,407	0.0		-52,263	0.0		-52,263	0.0		-52,263	0.0		-52,263	0.0	
18	55.3	45.9	-47,854	0.0		-43,320	0.0		-43,320	0.0		-43,320	0.0		-43,320	0.0	
19	54.4	46.1	-45,165	0.0		-32,314	0.0		-32,314	0.0		-32,314	0.0		-32,314	0.0	
20	52.8	46.3	-64,138	0.0		-45,399	0.0		-45,399	0.0		-45,399	0.0		-45,399	0.0	
21	50.8	45.5	-80,772	0.0		-58,952	0.0		-58,952	0.0		-58,952	0.0		-58,952	0.0	
22	48.4	43.7	-89,550	0.0		-66,876	0.0		-66,876	0.0		-66,876	0.0		-66,876	0.0	
23	45.7	41.6	-96,473	0.0		-75,705	0.0		-75,705	0.0		-75,705	0.0		-75,705	0.0	
24	42.9	39.2	-121,310	0.0		-92,022	0.0		-92,627	0.0		-92,627	0.0		-92,022	0.0	

April			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton	
1	56.3	50.9	-48,394	0.0		-39,687	0.0		-39,687	0.0		-39,687	0.0		-39,687	0.0	
2	54.2	48.9	-53,415	0.0		-46,691	0.0		-46,691	0.0		-46,691	0.0		-46,691	0.0	
3	52.3	47.7	-58,375	0.0		-53,248	0.0		-53,248	0.0		-53,248	0.0		-53,248	0.0	
4	50.7	46.4	-61,723	0.0		-58,650	0.0		-58,650	0.0		-58,650	0.0		-58,650	0.0	
5	49.5	45.4	-69,256	0.0		-69,236	0.0		-69,236	0.0		-69,236	0.0		-69,236	0.0	
6	48.8	44.7	-62,082	0.0		-66,069	0.0		-66,069	0.0		-66,069	0.0		-66,069	0.0	
7	48.5	44.7	-38,717	0.0		-54,757	0.0		-54,757	0.0		-54,757	0.0		-54,757	0.0	
8	49.2	44.5	-30,494	0.0		-51,088	0.0		-51,088	0.0		-51,088	0.0		-51,088	0.0	
9	51.2	44.6	-28,951	0.0		-52,661	0.0		-52,661	0.0		-52,661	0.0		-52,661	0.0	
10	54.2	46.1	-22,929	0.0		-48,305	0.0		-48,305	0.0		-48,305	0.0		-48,305	0.0	
11	57.8	48.8	-18,093	0.0		-44,348	0.0		-44,348	0.0		-44,348	0.0		-44,348	0.0	
12	61.8	51.6	0	0.0		-21,546	0.0		-21,546	0.0		-21,546	0.0		-21,546	0.0	
13	65.4	54.4	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
14	68.4	56.7	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
15	70.4	58.3	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
16	71.0	58.2	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
17	70.8	58.5	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
18	70.1	58.2	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
19	68.9	58.3	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
20	67.3	58.5	-8,247	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
21	65.4	57.9	-21,656	0.0		-8,509	0.0		-8,509	0.0		-8,509	0.0		-8,509	0.0	
22	63.3	56.3	-29,138	0.0		-16,133	0.0		-16,133	0.0		-16,133	0.0		-16,133	0.0	
23	61.0	54.8	-35,413	0.0		-23,800	0.0		-23,800	0.0		-23,800	0.0		-23,800	0.0	
24	58.6	53.0	-40,404	0.0		-31,884	0.0		-31,884	0.0		-31,884	0.0		-31,884	0.0	



May			----- Design -----			----- Weekday -----			----- Saturday-----				----- Sunday -----				----- Monday -----			
Hour	OADB	OAWB	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton		
1	63.3	59.6		0		11.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0		
2	61.3	57.9		0		2.5	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0		
3	59.7	56.5		0		0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0		
4	58.4	55.5		0		0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0		
5	57.6	54.8		0		0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0		
6	57.4	54.7		0		0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0		
7	57.9	55.2	-1,705			2.4	0			1.6	0	0	0	0.0	0	0	0	1.6		
8	59.4	55.6		0		6.7	0			3.8	0	0	0	0.0	0	0	0	3.8		
9	61.7	56.5		0		12.7	0			6.9	0	0	0	0.3	0	0	0	6.9		
10	64.6	57.7		0		13.1	0			8.5	0	0	0	1.1	0	0	0	8.5		
11	67.8	59.7		0		11.9	0			10.0	0	0	0	1.8	0	0	0	10.0		
12	71.0	62.0		0		11.0	0			8.3	0	0	0	2.0	0	0	0	8.3		
13	73.9	63.9		0		14.0	0			11.4	0	0	0	2.0	0	0	0	11.4		
14	76.3	65.3		0		15.6	0			12.8	0	0	0	2.1	0	0	0	12.8		
15	77.7	66.4		0		17.4	0			14.9	0	0	0	3.6	0	0	0	14.9		
16	78.2	66.4		0		12.6	0			10.8	0	0	0	4.1	0	0	0	10.8		
17	78.0	66.3		0		10.4	0			9.2	0	0	0	4.2	0	0	0	9.2		
18	77.2	66.2		0		8.0	0			7.3	0	0	0	3.8	0	0	0	7.3		
19	76.0	66.5		0		7.5	0			7.0	0	0	0	3.4	0	0	0	7.0		
20	74.3	66.4		0		6.5	0			6.7	0	0	0	2.9	0	0	0	6.7		
21	72.3	66.5		0		3.5	0			3.8	0	0	0	2.3	0	0	0	3.8		
22	70.1	64.9		0		2.1	0			2.5	0	0	0	1.8	0	0	0	2.5		
23	67.8	63.2		0		0.7	0			1.2	0	0	0	1.2	0	0	0	1.2		
24	65.5	61.4		0		0.3	0			0.2	0	0	0	0.2	0	0	0	0.2		

June			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	66.2	65.3		0	1.6		0	0.8		0	0.8		0	0.8		0	0.8
2	65.3	63.9		0	1.0		0	0.1		0	0.1		0	0.1		0	0.1
3	64.5	62.4		0	0.9		0	0.0		0	0.0		0	0.0		0	0.0
4	64.0	61.3		0	0.8		0	0.0		0	0.0		0	0.0		0	0.0
5	63.8	60.8		0	0.1		0	0.0		0	0.0		0	0.0		0	0.0
6	64.2	61.2		0	0.3		0	0.0		0	0.0		0	0.0		0	0.0
7	65.1	61.7		0	9.5		0	5.5		0	0.1		0	0.1		0	5.5
8	66.8	62.3		0	12.7		0	11.2		0	1.2		0	1.2		0	11.3
9	69.3	63.3		0	15.1		0	13.9		0	2.2		0	2.2		0	13.9
10	72.1	65.2		0	16.5		0	14.8		0	2.9		0	2.9		0	14.8
11	75.4	67.5		0	15.1		0	13.7		0	3.4		0	3.4		0	13.7
12	78.4	69.8		0	14.1		0	12.6		0	5.0		0	5.0		0	12.6
13	80.7	71.6		0	17.5		0	16.4		0	6.7		0	6.7		0	16.4
14	82.2	72.7		0	19.5		0	17.5		0	7.0		0	7.0		0	17.5
15	82.8	72.8		0	20.9		0	19.4		0	7.7		0	7.7		0	19.4
16	82.2	73.1		0	16.1		0	14.4		0	7.3		0	7.3		0	14.4
17	80.9	72.7		0	13.7		0	12.2		0	6.7		0	6.7		0	12.2
18	78.8	71.6		0	11.5		0	9.6		0	5.7		0	5.7		0	9.6
19	76.3	71.3		0	10.7		0	8.7		0	4.6		0	4.6		0	8.7
20	73.8	72.0		0	9.8		0	7.9		0	3.6		0	3.6		0	7.9
21	71.8	71.8		0	6.3		0	4.4		0	2.8		0	2.8		0	4.4
22	69.9	71.0		0	4.2		0	2.9		0	2.0		0	2.0		0	2.9
23	68.3	68.9		0	2.6		0	1.3		0	1.4		0	1.4		0	1.3
24	67.2	66.8		0	2.2		0	0.9		0	0.9		0	0.9		0	0.9

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

July			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	70.9	71.0		0	3.9		0	2.4		0	2.3		0	2.4		0	2.4
2	69.8	68.8		0	2.9		0	1.5		0	1.5		0	1.6		0	1.6
3	68.9	67.0		0	2.6		0	1.3		0	1.3		0	1.3		0	1.3
4	68.2	65.9		0	1.9		0	1.1		0	1.1		0	1.1		0	1.1
5	68.0	65.2		0	1.9		0	1.0		0	1.0		0	1.0		0	1.0
6	68.4	64.9		0	2.0		0	0.4		0	0.4		0	0.4		0	0.4
7	69.6	65.3		0	11.8		0	10.0		0	1.2		0	1.2		0	10.0
8	71.6	65.6		0	14.6		0	12.7		0	2.3		0	2.3		0	12.7
9	74.5	65.7		0	17.7		0	15.7		0	3.7		0	3.7		0	15.7
10	77.9	66.5		0	18.2		0	17.0		0	5.8		0	5.8		0	17.0
11	81.7	67.9		0	17.0		0	15.6		0	7.0		0	7.0		0	15.6
12	85.3	69.9		0	15.8		0	14.3		0	8.0		0	8.0		0	14.3
13	88.0	71.3		0	19.8		0	18.2		0	8.8		0	8.8		0	18.2
14	89.8	72.5		0	20.8		0	19.2		0	9.1		0	9.1		0	19.2
15	90.5	73.9		0	21.9		0	20.9		0	9.7		0	9.7		0	20.9
16	89.8	75.3		0	18.1		0	16.2		0	9.5		0	9.5		0	16.2
17	88.2	75.5		0	15.2		0	13.7		0	8.5		0	8.5		0	13.7
18	85.8	76.2		0	13.0		0	11.4		0	7.9		0	7.9		0	11.4
19	82.8	76.7		0	11.9		0	10.6		0	6.9		0	6.9		0	10.6
20	79.9	78.6		0	11.8		0	9.8		0	5.9		0	5.9		0	9.8
21	77.4	78.8		0	8.4		0	6.6		0	5.1		0	5.1		0	6.6
22	75.2	78.0		0	6.9		0	5.2		0	4.4		0	4.4		0	5.2
23	73.4	75.4		0	4.8		0	3.1		0	3.2		0	3.2		0	3.1
24	72.0	73.0		0	4.3		0	2.6		0	2.7		0	2.7		0	2.6

August			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	68.0	65.3		0	2.2		0	0.9		0	0.9		0	0.9		0	0.9
2	67.0	63.5		0	1.9		0	0.8		0	0.8		0	0.8		0	0.8
3	66.2	62.2		0	1.2		0	0.7		0	0.7		0	0.7		0	0.7
4	65.6	61.1		0	1.0		0	0.0		0	0.0		0	0.0		0	0.0
5	65.4	60.7		0	1.0		0	0.0		0	0.0		0	0.0		0	0.0
6	65.8	60.7		0	1.0		0	0.0		0	0.0		0	0.0		0	0.0
7	66.8	61.2		0	9.0		0	6.4		0	0.4		0	0.4		0	6.4
8	68.6	61.6		0	12.0		0	10.7		0	1.1		0	1.1		0	10.7
9	71.2	62.5		0	15.9		0	13.5		0	1.9		0	1.9		0	13.5
10	74.3	63.6		0	16.7		0	14.4		0	2.7		0	2.7		0	14.4
11	77.7	65.1		0	15.2		0	13.3		0	3.8		0	3.8		0	13.3
12	80.9	66.8		0	13.8		0	12.4		0	6.2		0	6.2		0	12.4
13	83.4	68.2		0	17.1		0	16.3		0	7.2		0	7.2		0	16.3
14	85.0	69.7		0	19.1		0	17.3		0	7.4		0	7.4		0	17.3
15	85.6	70.7		0	20.3		0	18.7		0	7.6		0	7.6		0	18.7
16	85.0	70.5		0	16.0		0	13.9		0	7.1		0	7.1		0	13.9
17	83.6	70.4		0	13.1		0	11.6		0	6.5		0	6.5		0	11.6
18	81.3	70.7		0	10.8		0	9.5		0	5.9		0	5.9		0	9.5
19	78.7	70.7		0	10.0		0	8.4		0	4.7		0	4.7		0	8.4
20	76.1	71.9		0	9.3		0	7.7		0	3.8		0	3.8		0	7.7
21	73.9	72.4		0	6.2		0	4.7		0	3.1		0	3.1		0	4.7
22	71.8	71.1		0	4.8		0	3.3		0	2.6		0	2.6		0	3.3
23	70.2	69.3		0	3.4		0	1.5		0	1.6		0	1.6		0	1.5
24	69.0	67.2		0	2.5		0	1.3		0	1.3		0	1.3		0	1.3

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

September			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	61.8	61.5	0	0.5	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
2	60.8	59.7	0	0.3	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
3	60.0	58.4	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
4	59.4	57.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
5	59.2	56.3	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
6	59.6	56.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	1.5	0.0
7	60.6	56.7	0	3.1	0.0	0	1.6	0.0	0	0.0	0.0	0	0.0	0.0	0	5.7	0.0
8	62.4	57.9	0	9.6	0.0	0	5.7	0.0	0	0.0	0.0	0	0.0	0.0	0	12.1	0.0
9	65.1	58.6	0	13.2	0.0	0	12.3	0.0	0	0.0	0.0	0	0.0	0.0	0	12.9	0.0
10	68.1	59.6	0	14.2	0.0	0	12.9	0.0	0	1.3	0.0	0	1.3	0.0	0	11.4	0.0
11	71.6	61.1	0	13.1	0.0	0	11.4	0.0	0	2.6	0.0	0	2.6	0.0	0	10.2	0.0
12	74.8	62.7	0	11.9	0.0	0	10.2	0.0	0	2.9	0.0	0	2.9	0.0	0	13.6	0.0
13	77.2	64.6	0	15.7	0.0	0	13.6	0.0	0	3.1	0.0	0	3.1	0.0	0	15.4	0.0
14	78.9	66.0	0	16.9	0.0	0	15.4	0.0	0	5.4	0.0	0	5.4	0.0	0	16.8	0.0
15	79.5	67.1	0	18.2	0.0	0	16.8	0.0	0	5.9	0.0	0	5.9	0.0	0	12.2	0.0
16	78.9	67.5	0	14.1	0.0	0	12.2	0.0	0	5.4	0.0	0	5.4	0.0	0	9.8	0.0
17	77.4	67.9	0	12.0	0.0	0	9.8	0.0	0	4.7	0.0	0	4.7	0.0	0	7.3	0.0
18	75.2	68.0	0	9.2	0.0	0	7.3	0.0	0	3.7	0.0	0	3.7	0.0	0	6.7	0.0
19	72.6	69.3	0	8.4	0.0	0	6.7	0.0	0	2.8	0.0	0	2.8	0.0	0	6.0	0.0
20	69.9	70.0	0	7.6	0.0	0	6.0	0.0	0	1.9	0.0	0	1.9	0.0	0	2.9	0.0
21	67.7	69.0	0	4.0	0.0	0	2.9	0.0	0	1.2	0.0	0	1.2	0.0	0	1.5	0.0
22	65.7	67.3	0	2.5	0.0	0	1.5	0.0	0	0.8	0.0	0	0.8	0.0	0	0.5	0.0
23	64.0	65.4	0	1.2	0.0	0	0.5	0.0	0	0.5	0.0	0	0.5	0.0	0	0.0	0.0
24	62.8	63.6	0	0.8	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0

October			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	50.7	45.9	-3,267	0.0	0.0	-57,888	0.0	0.0	-57,888	0.0	0.0	-57,888	0.0	0.0	-57,888	0.0	0.0
2	48.4	44.0	0	0.0	0.0	-65,664	0.0	0.0	-65,664	0.0	0.0	-65,664	0.0	0.0	-65,664	0.0	0.0
3	46.3	42.0	-23,212	0.0	0.0	-72,779	0.0	0.0	-72,779	0.0	0.0	-72,779	0.0	0.0	-72,779	0.0	0.0
4	44.6	40.8	-69,043	0.0	0.0	-78,453	0.0	0.0	-78,453	0.0	0.0	-78,453	0.0	0.0	-78,453	0.0	0.0
5	43.4	39.7	-83,172	0.0	0.0	-89,149	0.0	0.0	-89,149	0.0	0.0	-89,149	0.0	0.0	-89,149	0.0	0.0
6	42.6	39.1	-76,048	0.0	0.0	-97,763	0.0	0.0	-97,512	0.0	0.0	-97,512	0.0	0.0	-97,512	0.0	0.0
7	42.3	38.9	-59,062	0.0	0.0	-76,677	0.0	0.0	-76,677	0.0	0.0	-76,677	0.0	0.0	-76,677	0.0	0.0
8	43.4	39.8	-49,553	0.0	0.0	-69,859	0.0	0.0	-69,859	0.0	0.0	-69,859	0.0	0.0	-69,859	0.0	0.0
9	46.3	41.5	-45,651	0.0	0.0	-68,868	0.0	0.0	-68,868	0.0	0.0	-68,868	0.0	0.0	-68,868	0.0	0.0
10	50.7	43.0	-37,446	0.0	0.0	-60,123	0.0	0.0	-60,123	0.0	0.0	-60,123	0.0	0.0	-60,123	0.0	0.0
11	56.0	45.7	-29,909	0.0	0.0	-50,719	0.0	0.0	-50,719	0.0	0.0	-50,719	0.0	0.0	-50,719	0.0	0.0
12	61.2	49.1	-5,554	0.0	0.0	-23,934	0.0	0.0	-23,934	0.0	0.0	-23,934	0.0	0.0	-23,934	0.0	0.0
13	65.6	52.3	-1,930	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
14	68.5	54.1	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
15	69.6	54.8	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
16	69.3	54.0	0	0.0	0.0	-3,256	0.0	0.0	-3,256	0.0	0.0	-3,256	0.0	0.0	-3,256	0.0	0.0
17	68.5	54.2	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
18	67.3	54.6	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
19	65.6	55.9	-1,410	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
20	63.5	55.7	-26,557	0.0	0.0	-14,967	0.0	0.0	-14,967	0.0	0.0	-14,967	0.0	0.0	-14,967	0.0	0.0
21	61.2	54.5	-36,553	0.0	0.0	-23,148	0.0	0.0	-23,148	0.0	0.0	-23,148	0.0	0.0	-23,148	0.0	0.0
22	58.6	52.4	-45,707	0.0	0.0	-31,653	0.0	0.0	-31,653	0.0	0.0	-31,653	0.0	0.0	-31,653	0.0	0.0
23	56.0	50.0	-53,278	0.0	0.0	-40,247	0.0	0.0	-40,247	0.0	0.0	-40,247	0.0	0.0	-40,247	0.0	0.0
24	53.3	48.0	-58,918	0.0	0.0	-49,243	0.0	0.0	-49,243	0.0	0.0	-49,243	0.0	0.0	-49,243	0.0	0.0

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 1350 BASERUN FT LEONARD WOOD

November			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	43.8	40.3	-80,616	0.0	-81,938	0.0	-81,938	0.0	-81,938	0.0	-81,938	0.0
2	42.0	38.9	-84,470	0.0	-101,127	0.0	-98,298	0.0	-98,298	0.0	-98,298	0.0
3	40.5	37.5	-87,345	0.0	-109,622	0.0	-109,622	0.0	-109,622	0.0	-109,622	0.0
4	39.4	36.3	-99,662	0.0	-114,568	0.0	-114,568	0.0	-123,975	0.0	-123,975	0.0
5	38.7	35.8	-109,077	0.0	-118,319	0.0	-118,319	0.0	-128,798	0.0	-128,798	0.0
6	38.4	35.6	-114,762	0.0	-126,387	0.0	-126,387	0.0	-137,465	0.0	-137,465	0.0
7	39.1	36.3	-103,836	0.0	-124,644	0.0	-124,888	0.0	-127,627	0.0	-127,627	0.0
8	41.0	38.2	-71,041	0.0	-85,135	0.0	-97,217	0.0	-97,217	0.0	-85,135	0.0
9	43.8	40.6	-57,218	0.0	-71,502	0.0	-80,782	0.0	-80,782	0.0	-71,502	0.0
10	47.3	42.8	-54,279	0.0	-66,653	0.0	-72,117	0.0	-72,117	0.0	-66,653	0.0
11	51.1	45.4	-47,630	0.0	-59,611	0.0	-60,278	0.0	-60,278	0.0	-59,611	0.0
12	54.6	47.5	-43,657	0.0	-55,951	0.0	-55,951	0.0	-55,951	0.0	-55,951	0.0
13	57.4	49.2	-25,539	0.0	-36,985	0.0	-36,985	0.0	-36,985	0.0	-36,985	0.0
14	59.3	50.0	-5,544	0.0	-16,940	0.0	-16,940	0.0	-16,940	0.0	-16,940	0.0
15	59.9	50.3	-11,165	0.0	-22,576	0.0	-22,576	0.0	-22,576	0.0	-22,576	0.0
16	59.7	50.1	-19,895	0.0	-30,001	0.0	-30,001	0.0	-30,001	0.0	-30,001	0.0
17	59.0	50.0	-32,542	0.0	-39,989	0.0	-39,989	0.0	-39,989	0.0	-39,989	0.0
18	57.9	50.8	-30,821	0.0	-33,832	0.0	-33,832	0.0	-33,832	0.0	-33,832	0.0
19	56.4	51.0	-26,546	0.0	-24,991	0.0	-24,991	0.0	-24,991	0.0	-24,991	0.0
20	54.6	49.7	-43,863	0.0	-38,794	0.0	-38,794	0.0	-38,794	0.0	-38,794	0.0
21	52.5	48.2	-59,095	0.0	-52,924	0.0	-52,924	0.0	-52,924	0.0	-52,924	0.0
22	50.3	46.2	-66,224	0.0	-60,174	0.0	-60,174	0.0	-60,174	0.0	-60,174	0.0
23	48.1	44.0	-72,103	0.0	-67,474	0.0	-67,474	0.0	-67,474	0.0	-67,474	0.0
24	45.9	42.4	-76,653	0.0	-74,821	0.0	-74,821	0.0	-74,821	0.0	-74,821	0.0

December			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	32.1	29.4	-136,328	0.0	-166,613	0.0	-160,491	0.0	-166,613	0.0	-166,613	0.0
2	30.2	27.8	-161,049	0.0	-177,030	0.0	-177,030	0.0	-181,344	0.0	-181,344	0.0
3	28.5	25.9	-164,651	0.0	-185,700	0.0	-185,700	0.0	-198,494	0.0	-198,494	0.0
4	27.1	24.9	-193,542	0.0	-193,674	0.0	-193,674	0.0	-207,565	0.0	-207,565	0.0
5	26.1	24.0	-197,038	0.0	-199,215	0.0	-199,215	0.0	-214,075	0.0	-214,075	0.0
6	25.4	23.6	-201,640	0.0	-210,725	0.0	-210,725	0.0	-227,142	0.0	-227,142	0.0
7	25.2	23.3	-190,448	0.0	-208,067	0.0	-205,049	0.0	-221,401	0.0	-221,401	0.0
8	25.8	24.0	-134,303	0.0	-156,351	0.0	-193,484	0.0	-195,120	0.0	-156,351	0.0
9	27.5	25.7	-117,511	0.0	-142,741	0.0	-182,054	0.0	-182,054	0.0	-142,741	0.0
10	30.2	27.9	-113,058	0.0	-139,248	0.0	-169,079	0.0	-169,079	0.0	-139,248	0.0
11	33.4	30.3	-105,387	0.0	-134,317	0.0	-154,807	0.0	-154,807	0.0	-134,317	0.0
12	36.9	32.7	-98,301	0.0	-127,081	0.0	-143,697	0.0	-143,697	0.0	-127,081	0.0
13	40.2	35.1	-75,638	0.0	-100,194	0.0	-110,182	0.0	-110,182	0.0	-100,194	0.0
14	42.8	36.9	-56,419	0.0	-75,166	0.0	-81,476	0.0	-81,476	0.0	-75,166	0.0
15	44.6	38.1	-61,946	0.0	-77,004	0.0	-81,730	0.0	-81,730	0.0	-77,004	0.0
16	45.2	38.5	-70,771	0.0	-81,940	0.0	-85,798	0.0	-85,798	0.0	-81,940	0.0
17	44.9	38.7	-83,056	0.0	-88,123	0.0	-93,306	0.0	-93,306	0.0	-88,123	0.0
18	44.3	39.6	-80,729	0.0	-80,242	0.0	-84,017	0.0	-84,017	0.0	-80,242	0.0
19	43.3	39.6	-75,683	0.0	-69,615	0.0	-75,136	0.0	-75,136	0.0	-69,615	0.0
20	41.9	38.6	-97,730	0.0	-87,039	0.0	-94,808	0.0	-94,808	0.0	-87,039	0.0
21	40.2	37.1	-124,541	0.0	-108,635	0.0	-117,817	0.0	-117,817	0.0	-108,635	0.0
22	38.3	35.3	-136,468	0.0	-119,652	0.0	-131,075	0.0	-131,075	0.0	-119,652	0.0
23	36.2	33.4	-145,370	0.0	-130,087	0.0	-143,110	0.0	-143,110	0.0	-130,087	0.0
24	34.1	31.4	-154,771	0.0	-139,095	0.0	-156,919	0.0	-156,919	0.0	-139,095	0.0

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BLDG 1350 BASERUN FT LEONARD WOOD

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

Temperature	Room Number				
Range	1	2	3	4	5
(F)					
Max. Temp.	120.2	365.1	80.4	95.3	86.3
Mo./Hr.	8 19 12 21	4 17	7 19	4 16	
Day Type	1	5	1	1	1
	..... Number of Hours .....				
Above 100	2,924	5,880	0	0	0
95 - 100	31	0	0	0	0
90 - 95	343	0	0	1,555	0
85 - 90	338	0	0	1,842	0
80 - 85	36	0	0	305	849
75 - 80	30	192	770	730	1,863
70 - 75	396	570	6,421	1,711	5,692
65 - 70	4,662	2,118	1,569	2,617	356
60 - 65	0	0	0	0	0
55 - 60	0	0	0	0	0
50 - 55	0	0	0	0	0
Below 50	0	0	0	0	0
Min. Temp.	61.4	67.0	70.0	69.9	70.0
Mo./Hr.	5 5 1 1 1 1 1 23	1 1			
Day Type	1	1	1	2	1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1

BLDG 1350 BASERUN FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	26,896	68	1,360	3
Feb	24,306	68	1,254	3
March	27,659	68	967	3
April	25,190	68	257	1
May	25,059	69	0	0
June	26,135	73	0	0
July	27,253	75	0	0
Aug	27,290	73	0	0
Sept	24,024	70	0	0
Oct	26,703	68	378	1
Nov	25,906	68	613	2
Dec	26,515	68	1,280	3
Total	312,936	75	6,109	3

Building Energy Consumption = 94,977 (Btu/Sq Ft/Year)  
Source Energy Consumption = 217,655 (Btu/Sq Ft/Year)

Floor Area = 17,677 (Sq Ft)

## EQUIPMENT ENERGY CONSUMPTION

[illegible]

	ELEC	0	0	0	0	228	341	413	355	239	0	0	0	1,576
	PK	0.0	0.0	0.0	0.0	1.3	1.5	1.6	1.5	1.3	0.0	0.0	0.0	1.6
2	EQ5313	CONTROLS												881
	ELEC	0	0	0	0	150	169	223	195	144	0	0	0	0.3
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
1	EQ4003	FC CENTRIF. FAN C.V.												11,387
	ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	2.2
	PK	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	2.2	2.2	2.2	
1	EQ4003	FC CENTRIF. FAN C.V.												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	EQ4381	PROPELLER FAN												1,638
	ELEC	139	126	139	135	139	135	139	139	135	139	135	139	0.2
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
2	EQ4381	PROPELLER FAN												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	EQ4003	FC CENTRIF. FAN C.V.												19,605
	ELEC	1665	1504	1665	1611	1665	1611	1665	1665	1611	1665	1611	1665	2.2
	PK	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
3	EQ4003	FC CENTRIF. FAN C.V.												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	EQ4003	FC CENTRIF. FAN C.V.												11,387
	ELEC	1665	1504	1665	1611	0	0	0	0	0	1665	1611	1665	2.2
	PK	2.2	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	
4	EQ4003	FC CENTRIF. FAN C.V.												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	EQ4003	FC CENTRIF. FAN C.V.												32,675
	ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	3.7
	PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
5	EQ4003	FC CENTRIF. FAN C.V.												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ2001	GAS FIRE TUBE HOT WATER												6,109
	GAS	1360	1254	967	257	0	0	0	0	0	378	613	1280	3.4
	PK	3.4	3.2	2.6	0.9	0.0	0.0	0.0	0.0	0.0	1.2	1.7	2.8	
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BLDG 1350 BASERUN FT LEONARD WOOD

	ELEC	1110	1003	1110	671	0	0	0	0	0	786	1074	1110	6,865
	PK	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	1.5
1	EQ5240	BOILER FORCED DRAFT FAN												
	ELEC	490	442	490	296	0	0	0	0	0	347	474	490	3,027
	PK	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7
1	EQ5307	BOILER CONTROLS												
	ELEC	372	336	372	225	0	0	0	0	0	263	360	372	2,301
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

BLDG 1720 - E.M. BARRACKS NIGHT SETBACK (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	696	9	0	0	-.5598E+06	.0000
FEB	560	34	0	0	-.4808E+06	.1025E+06
MAR	516	110	0	0	-.4780E+06	.2656E+06
APR	262	270	0	0	-.2802E+06	.3054E+06
MAY	79	482	0	0	-.1698E+06	.3786E+06
JUN	4	636	0	0	-.2159E+05	.4953E+06
JUL	0	703	0	0	.0000	.5628E+06
AUG	5	696	0	0	-.3783E+05	.5253E+06
SEP	112	515	0	0	-.1492E+06	.5268E+06
OCT	298	244	0	0	-.2520E+06	.3688E+06
NOV	505	79	0	0	-.3812E+06	.2352E+06
DEC	698	7	1	0	-.6209E+06	.9568E+05
YEAR	3735	3785	1	0	-.6209E+06	.5628E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	234.59	.00	4.93	23.68	.75	33.68	17.1
FEB	175.39	.01	4.45	21.38	.68	30.42	17.1
MAR	140.25	.45	4.93	23.68	.75	33.68	26.5
APR	56.76	2.07	4.77	22.91	.73	32.60	28.5
MAY	13.74	4.23	4.93	23.68	.75	33.68	32.4
JUN	.59	8.46	4.77	22.91	.73	32.60	38.4
JUL	.00	10.60	4.93	23.68	.75	33.68	40.8
AUG	.74	9.79	4.93	23.68	.75	33.68	35.7
SEP	19.11	6.23	4.77	22.91	.73	32.60	34.8
OCT	59.38	1.87	4.93	23.68	.75	33.68	28.8
NOV	125.78	.50	4.77	22.91	.73	32.60	25.3
DEC	232.07	.03	4.93	23.68	.75	33.68	17.1
YEAR	1058.40	44.24	58.02	278.77	8.83	396.61	40.8

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR

75027. BTU/(SQFT-YEAR)

BLDG 1720 - E.M. BARRACKS NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS SYSTEM NOT COOL	WHEN MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.5598E+06
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.1025E+06	-.4808E+06
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.2656E+06	-.4780E+06
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.3054E+06	-.2802E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.3786E+06	-.1698E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.4953E+06	-.2159E+05
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.5628E+06	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.5253E+06	-.3783E+05
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.5268E+06	-.1492E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.3688E+06	-.2520E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.2352E+06	-.3812E+06
DEC	883.	604.	1.000	35.	0.	0.	0	1	.9568E+05	-.6209E+06

BLDG 1720 - E.M. BARRACKS DDC (FT LEONARD WOOD, MO)

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----- PROGRAM CONTROL OPTIONS -----
COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1
ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0
WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000
LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1
SKY CLEARNESS FACTOR (CLN) 1.000000
NUMBER OF ZONES (NZ) 1
WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1
WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

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----- SITE AND BUILDING DATA -----
*****REAL WEATHER FROM DISK*****

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FILE NAME MO
STATION 13995 YEAR 1955
SITE LATITUDE DEG (AL1) 37.750000
ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000
MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000
AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000
SOLAR ABSORBTIVITY OF WALLS (ALPHA) 8.800000E-01
SOLAR ABSORBTIVITY OF ROOF (ALFRF) 2.900000E-01
SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01
INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000
INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000
INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03
INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00
VOLUME OF ZONE IN CUBIC FEET (VOLHS) 190625.000000
FLOOR AREA (SQFT) 22876.000000
HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 620930.000000
COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -725350.000000
COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 228760.000000
CONSTANT INFILTRATION RATE CFM (CFMI) 1348.000000
INFILTRATION PROFILE
.800 .800 .800 .800 .800 .800 1.00 1.00
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
1.00 1.00 1.00 1.00 1.00 .800 .800 .800
A FACTOR IN INFILTRATION EQUATION (CINA) 4.240000E-01
B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02
C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03
BUILDING THERMAL MASS MCP BTU/F (CMCP) 23702.360000
BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00
SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 294.000000
PARTITION UA BTU/HR-F (GUA) 0.000000E+00
DOOR UA BTU/HR-F (DUA) 98.000000
WINDOW GLASS NUMBER (NG) 30
DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01
NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01
WINDOW SHADING FACTOR (SHD) 5.900000E-01

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WALL DATA
1 2 3 4
WALL NUMBER 1 2 3 4
AZIMUTH ANGLE (AZ) .00 90.00 180.00 -90.00
WALL AREA SQFT (AWLL) 4236.0 4069.0 4236.0 4038.0
WINDOW AREA SQFT (AWND) .0 1148.0 .0 1179.0
WINDOW HEIGHT FT (WNDH) .0 10.0 .0 10.0
WINDOW WIDTH FT (WNDW) .0 114.8 .0 117.9
WIDTH OF OVERHANG (WOH) .0 .0 .0 .0
OVERHANG HGT ABV WNDW (HOH) .0 .0 .0 .0

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MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.137	.110	.138
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00405	.00505	.00405	.00508
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00001	.00001	.00001	.00001
N=2	.00056	.00070	.00056	.00071
N=3	.00223	.00278	.00223	.00280
N=4	.00116	.00144	.00116	.00145
N=5	.00009	.00011	.00009	.00011
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	5	5	5	5
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.71940	-1.71940	-1.71940	-1.71940
N=3	.84375	.84375	.84375	.84375
N=4	-.09022	-.09022	-.09022	-.09022
N=5	.00268	.00268	.00268	.00268
N=6	*****	*****	*****	*****
ROOF AREA SQFT (AROF)	7721.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	7.100000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	3.441956E-02			
ROOF B TRANSFER FUNCTIONS (BNR)				
.193E-02 .199E-01 .120E-01 .540E-03	771.	771.		
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -.600 .822E-01 -.300E-03	999.	999.		
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1	1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,END)		1	1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		1.800000E-01		

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
		16.	13093.	21600.	10080.		
		HOURLY FRACTION OF PEAK					
1		.200	.300	1.000	1.000	68.0	78.0
2		.200	.300	1.000	1.000	68.0	78.0
3		.200	.300	1.000	1.000	68.0	78.0
4		.200	.300	1.000	1.000	68.0	78.0
5		.400	.300	1.000	1.000	68.0	78.0
6		.800	.500	1.000	1.000	68.0	78.0
7	1.000	.500	.600	.600	.600	68.0	78.0
8	.200	.300	.400	.400	.400	68.0	78.0
9	.200	.300	.100	.100	.100	68.0	78.0
10	.200	.300	.100	.100	.100	68.0	78.0
11	.200	.300	.100	.100	.100	68.0	78.0
12	.200	.300	.100	.100	.100	68.0	78.0

13	.200	.300	.100	.100	68.0	78.0
14	.200	.300	.100	.100	68.0	78.0
15	.200	.300	.100	.100	68.0	78.0
16	.200	.500	.300	.300	68.0	78.0
17	.400	.600	.500	.500	68.0	78.0
18	.800	.700	.800	.800	68.0	78.0
19	1.000	.900	.900	.900	68.0	78.0
20	1.000	.900	.900	.900	68.0	78.0
21	1.000	.900	.900	.900	68.0	78.0
22	.500	.500	1.000	1.000	68.0	78.0
23	.200	.300	1.000	1.000	68.0	78.0
24	.200	.300	1.000	1.000	68.0	78.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN) 2						
SUPPLY AIR CFM (SACFM) 37800.000000						
ECONOMIZER HIGH TEMP LIMIT F 65.000000						
SYSTEM SUPPLY AIR START TIME HR 0.000000E+00						
SYSTEM SUPPLY AIR STOP TIME HR 24.000000						
SYSTEM MIXED AIR TEMP(TMXAIR) 55.000000						
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR) 0.000000E+00						
FAN EFFICIENCY (EFAN) 5.500000E-01						
FAN TOTAL PRESSURE IN. WATER (DP) 1.250000E-01						
HEATING PLANT RATED OUTPUT BTU (HFLOT) 620930.000000						
HEATING PLANT RATED INPUT BTU (HFLIN) 776162.000000						
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH) 0						
COOLING PLANT RATED OUTPUT BTU (CFLOT) 725350.000000						
COOLING PLANT RATED INPUT BTU (CFLIN) 134096.000000						
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 1720 - E.M. BARRACKS DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	0. -155.	GAIN LOSS	33.	0. -16.	0. -10.	0. 0.	0. -37.	0. -31.	0. -129.	0. 0.
FEB	0. -112.	GAIN LOSS	44.	0. -13.	0. -8.	0. 0.	0. -27.	0. -26.	0. -111.	0. 0.
MAR	6. -83.	GAIN LOSS	54.	0. -12.	0. -8.	0. 0.	2. -19.	0. -25.	0. -103.	1. 0.
APR	31.23 -27.67	GAIN LOSS	57.65	.41 -7.59	.02 -4.95	.00 .00	6.92 -8.41	.07 -15.55	.24 -61.15	3.51 .00
MAY	71.62 -4.58	GAIN LOSS	63.66	1.04 -5.30	.08 -3.21	.00 .00	13.19 -2.69	.25 -9.71	.72 -37.50	12.86 .00
JUN	146. 0.	GAIN LOSS	63.	2. -3.	0. -2.	0. 0.	20. -1.	1. -5.	3. -17.	52. 0.
JUL	189. 0.	GAIN LOSS	65.	3. -3.	1. -1.	0. 0.	26. 0.	3. -3.	9. -11.	67. 0.
AUG	172. 0.	GAIN LOSS	58.	2. -3.	1. -1.	0. 0.	22. 0.	2. -4.	6. -12.	67. 0.
SEP	102. -7.	GAIN LOSS	49.	1. -5.	0. -3.	0. 0.	12. -3.	1. -8.	4. -28.	40. 0.
OCT	24.18 -27.24	GAIN LOSS	40.12	.20 -7.95	.03 -4.63	.00 .00	3.23 -10.37	.11 -14.15	.35 -49.99	6.29 .00
NOV	5.49 -69.41	GAIN LOSS	31.42	.00 -10.53	.00 -6.36	.00 .00	.66 -20.37	.00 -19.47	.00 -72.96	1.09 .00
DEC	0. -152.	GAIN LOSS	29.	0. -15.	0. -10.	0. 0.	0. -38.	0. -30.	0. -122.	0. 0.
TOT	747. -637.	GAIN LOSS	587.	10. -101.	2. -62.	0. 0.	106. -167.	7. -191.	23. -754.	252. 0.

MAX HEATING LOAD= -615788. BTUH ON DEC 18 HOUR 8 AMBIENT TEMP 1.  
 MAX COOLING LOAD= 543250. BTUH ON JUL 3 HOUR 12 AMBIENT TEMP 86.

ZONE UA BTU/HR-F 4135.5



BEACON Energy Analysis By Energy Systems Engineers, Inc.

1720-1.I

BLDG 1720 - E.M. BARRACKS DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	68.	79.	67.	5 29	15 4	64. 11.	4.93	23.68	2.56	33.68
FEB	69.	79.	67.	17 2	13 3	59. 15.	4.45	21.38	2.31	30.42
MAR	70.	79.	67.	12 3	12 4	74. 17.	4.93	23.68	2.56	33.68
APR	73.	79.	68.	30 9	12 4	80. 31.	4.77	22.91	2.48	32.60
MAY	76.	79.	68.	28 11	12 4	85. 38.	4.93	23.68	2.56	33.68
JUN	78.	80.	68.	27 17	13 5	88. 56.	4.77	22.91	2.48	32.60
JUL	78.	80.	70.	3 10	12 5	86. 57.	4.93	23.68	2.56	33.68
AUG	78.	80.	68.	12 25	12 5	86. 52.	4.93	23.68	2.56	33.68
SEP	76.	80.	68.	3 15	12 4	89. 41.	4.77	22.91	2.48	32.60
OCT	73.	79.	68.	5 28	13 4	80. 30.	4.93	23.68	2.56	33.68
NOV	70.	79.	67.	7 3	14 4	73. 17.	4.77	22.91	2.48	32.60
DEC	68.	79.	67.	23 18	14 8	70. 1.	4.93	23.68	2.56	33.68
YEAR							58.02	278.77	30.15	396.61

BLDG 1720 - E.M. BARRACKS DDC (FT LEONARD WOOD, MO)

MONTH	NUMBER OF HOURS WHEN HEATING OR COOLING IS REQUIRED		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING	COOLING INCLUDING ECONOMIZER	HEATING	COOLING	HEATING	COOLING
JAN	691	5	0	0	-.5474E+06	.0000
FEB	549	23	0	0	-.4689E+06	.9049E+05
MAR	501	90	0	0	-.4658E+06	.2499E+06
APR	246	239	0	0	-.2701E+06	.2896E+06
MAY	65	433	0	0	-.1635E+06	.3612E+06
JUN	1	589	0	0	-8622.	.4771E+06
JUL	0	674	0	0	.0000	.5433E+06
AUG	4	672	0	0	-.3304E+05	.5065E+06
SEP	101	471	0	0	-.1424E+06	.5057E+06
OCT	285	206	0	0	-.2428E+06	.3517E+06
NOV	485	60	0	0	-.3710E+06	.2204E+06
DEC	693	4	0	0	-.6158E+06	.7552E+05
YEAR	3621	3466	0	0	-.6158E+06	.5433E+06

## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	226.68	.00	4.93	23.68	.75	33.68	17.1
FEB	168.32	.01	4.45	21.38	.68	30.42	17.1
MAR	133.58	.42	4.93	23.68	.75	33.68	26.1
APR	52.74	1.96	4.77	22.91	.73	32.60	28.0
MAY	11.40	4.04	4.93	23.68	.75	33.68	31.5
JUN	.15	7.90	4.77	22.91	.73	32.60	37.4
JUL	.00	10.04	4.93	23.68	.75	33.68	39.6
AUG	.59	9.27	4.93	23.68	.75	33.68	34.7
SEP	17.04	5.72	4.77	22.91	.73	32.60	34.0
OCT	55.62	1.69	4.93	23.68	.75	33.68	28.3
NOV	119.06	.46	4.77	22.91	.73	32.60	24.9
DEC	224.19	.02	4.93	23.68	.75	33.68	17.1
YEAR	1009.36	41.53	58.02	278.77	8.83	396.61	39.6

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 72480. BTU/(SQFT-YEAR)

BLDG 1720 - E.M. BARRACKS DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT- DAY	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS SYSTEM COOL	WHEN LOADS NOT MET HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1041.	675.	1.000	35.	0.	0.	0	0	.0000	-.5474E+06
FEB	1464.	929.	1.000	37.	0.	0.	0	0	.9049E+05	-.4689E+06
MAR	1922.	1254.	1.000	43.	0.	0.	0	0	.2499E+06	-.4658E+06
APR	2312.	1600.	1.000	55.	0.	0.	0	0	.2896E+06	-.2701E+06
MAY	2566.	1826.	1.000	65.	0.	0.	0	0	.3612E+06	-.1635E+06
JUN	2647.	1993.	1.000	72.	0.	0.	0	0	.4771E+06	-8622.
JUL	2546.	2015.	1.000	77.	0.	0.	0	0	.5433E+06	.0000
AUG	2280.	1840.	1.000	76.	0.	0.	0	0	.5065E+06	-.3304E+05
SEP	1856.	1371.	1.000	68.	0.	0.	0	0	.5057E+06	-.1424E+06
OCT	1437.	953.	1.000	57.	0.	0.	0	0	.3517E+06	-.2428E+06
NOV	1039.	732.	1.000	47.	0.	0.	0	0	.2204E+06	-.3710E+06
DEC	883.	604.	1.000	35.	0.	0.	0	0	.7552E+05	-.6158E+06

**COMPUTER SIMULATIONS**

**BUILDING 1721**

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 1721  
BLDG. TYPE: DAYROOM

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	148.9	110.1	102.9	102.9	139.1	145.5
COOLING (kWH)	5610	4900	4590	4560	5580	5420

SUPPLY AIR FAN	3490 CFM
FLOOR AREA	1920 FT²
CFMI	110 CFM
UA	703 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	600	2100	75 HR	HR. ON HEATING	2730 HR/YR
SAT.	600	2100	15 HR	HR. ON COOLING	1830 HR/YR
SUN.	600	2100	15 HR	HR. OFF HEATING	1638 HR/YR
	TOTAL OCCUPY HR.		105 HR/WK	HR. OFF COOLING	1098 HR/YR
	TOTAL UNOCC. HR.		63 HR/WK		
	ANNUAL OCCUPY HR.		5475 HR/YR		
	ANNUAL UNOCC. HR.		3285 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 2730 = 1638 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 1830 = 1098 HR/YR

HOAUHC	148.9 MBtu -	139.1 MBtu	=	2.71E+01 Btu/CFM-HR
	110 CFM *	3285 HR/YR		
HOAUH	148.9 MBtu -	139.1 MBtu	=	5.44E+01 Btu/CFM-HR
	110 CFM *	1638 HR/YR		
COAUHC	5610 kWH -	5580 kWH	=	8.30E-05 kWH/CFM-HR
	110 CFM *	3285 HR/YR		
COAUC	5610 kWH -	5580 kWH	=	2.48E-04 kWH/CFM-HR
	110 CFM *	1098 HR/YR		
HOAOHC	148.9 MBtu -	145.5 MBtu	=	5.65E+00 Btu/CFM-HR
	110 CFM *	5475 HR/YR		
HOAOH	148.9 MBtu -	145.5 MBtu	=	1.13E+01 Btu/CFM-HR
	110 CFM *	2730 HR/YR		
COAOHC	5610 kWH -	5420 kWH	=	3.15E-04 kWH/CFM-HR
	110 CFM *	5475 HR/YR		
COAOC	5610 kWH -	5420 kWH	=	9.44E-04 kWH/CFM-HR
	110 CFM *	1830 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				= 0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				= 0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 04-Mar-93  
BUILDING NO.: 1721  
BLDG. TYPE: DAYROOM

**ENERGY CONSTANT CALCULATIONS**

ECC	4590 KWH -	4560 KWH	=	4.70E-06 KWH/CFM-HR
	3490 CFM *	1830 HR/YR		
ECHO	4590 KWH -	4560 KWH	=	1.57E-06 KWH/CFM-HR
	3490 CFM *	5475 HR/YR		
NSUCHC	5610 KWH -	4900 KWH	=	6.19E-05 KWH/CFM-HR
	3490 CFM *	3285 HR/YR		
NSUCC	5610 KWH -	4900 KWH	=	1.85E-04 KWH/CFM-HR
	3490 CFM *	1098 HR/YR		
DDCCHO	4900 KWH -	4590 KWH	=	1.62E-05 KWH/CFM-HR
	3490 CFM *	5475 HR/YR		
DDCCO	4900 KWH -	4590 KWH	=	4.85E-05 KWH/CFM-HR
	3490 CFM *	1830 HR/YR		
NSC	148.9 MBtu -	110.09 MBtu	=	5.52E+04 Btu/UA
		703 UA		
DSC	110.09 MBtu -	102.9 MBtu	=	1.02E+04 Btu/UA
		703 UA		
OPT (2 HR/DAY X 272 DAY/YR) -		294 HR/YR	=	250 HR/YR
CHWR (0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)			=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 04-Feb-93

BY: BHS

JOB: 3204.000

CHK:

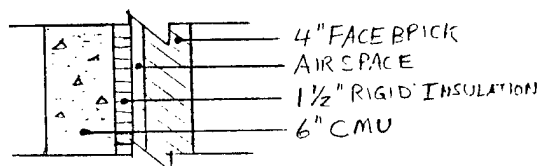
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**BUILDING HEATING LOAD CALCULATION SHEET**

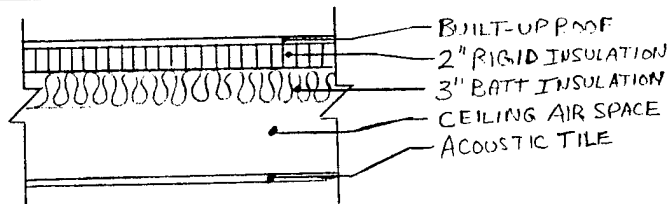
BLDG NO: 1721 BLDG NAME: DAYROOM  
BLDG FUNCTION: MAIL/ LOUNGE/ RECREATION # FLOORS 1  
FLOOR AREA: (SQ. FT) 1,920  
SLAB PERIMETER: (FT) 190

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	553	394	556	611	2,114
GLASS	(SQ. FT)	60	60	0	72	192
PERSONNEL DOOR	(SQ. FT)	21	21	0	0	42
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	472	313	556	539	1,880
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					1,920
OVERHEAD DOOR	(SQ. FT)	0				42
PERSONNEL DOOR	(SQ. FT)					0
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 1.5" INSULATION	4.98
5. 6" CMU	1.89
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	9.06
U=1/R	0.110

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.67
4. 3" BATT INSULATION	11.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	21.64
U=1/R	0.046

GLASS TYPE:	PPG 'PENNVERNON' C.L. TWNDV, SSA, .88 S.C.	R-GLASS	1.61
SLAB TYPE FLOOR:	CEMENT	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)	L	2114	X CFM / SQ.FT.	0.042	=	89
AVG. WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS		15	X CFM / OPENING / HR	1.385	=	21
TOTAL INFILTRATION (CFM)					=	110

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	1,880	X WALL 'U'	0.110	=	207
UA ROOF	= ROOF AREA	1,920	X ROOF 'U'	0.046	=	89
UA GLASS	= GLASS AREA	192	X GLASS 'U'	0.621	=	119
UA SLAB	= SLAB PERIM.	190	X SLF	0.830	=	158
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	110	X A. T. F.	1.035	=	113
TOTAL UA (BTU/HR°F)						703



**EMC NO.:**

**PROJECT: EEAP. EMCS EXPANSION FEASIBILITY STUDY**

CLIENT CONTRACT NO.: DACA 41 -92 -C -0098

CLIENT PROJ. ENG: DOUG CAGE

**LOCATION: FT. LEONARD WOOD**

DATE: \_\_\_\_\_  
PREPARED BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_

FILE

BUDG:

**ZONE:**

Rates of Heat Gain from Occupants of Conditioned Spaces								
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
1	20	5	Standing, light work, or walking slowly	Retail store, bank	270	220	5,400	4,400
TOTAL	20					TOTAL	5,400	4,400

### Peak Wattage Value for Lights

<b>Peak Wattage Value for Lights</b>					
<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
1	10	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	1,680
	7	18	Incandescent - 60w	60	420
	4	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	200
	3	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	252
<b>TOTAL</b>	24			<b>TOTAL</b>	<b>2,552</b>

## Peak Value for Internal Gains

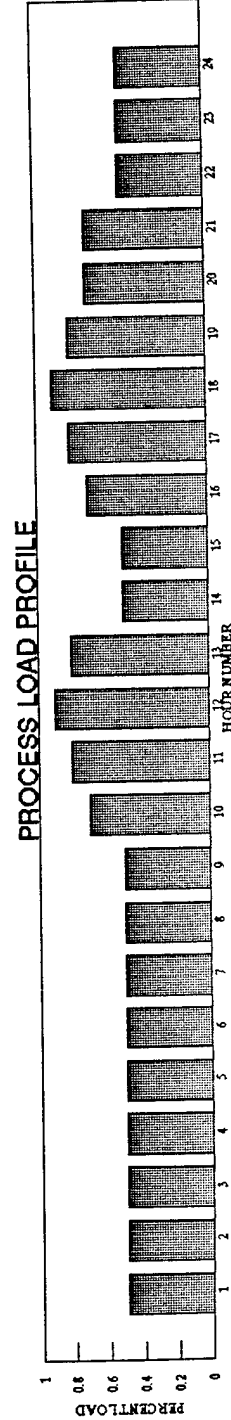
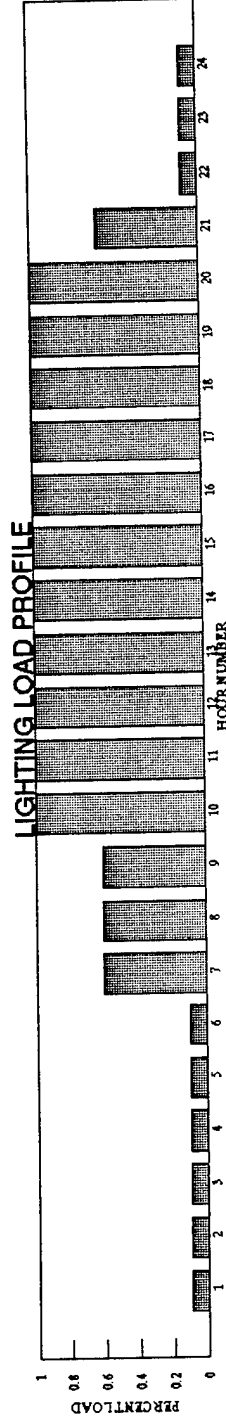
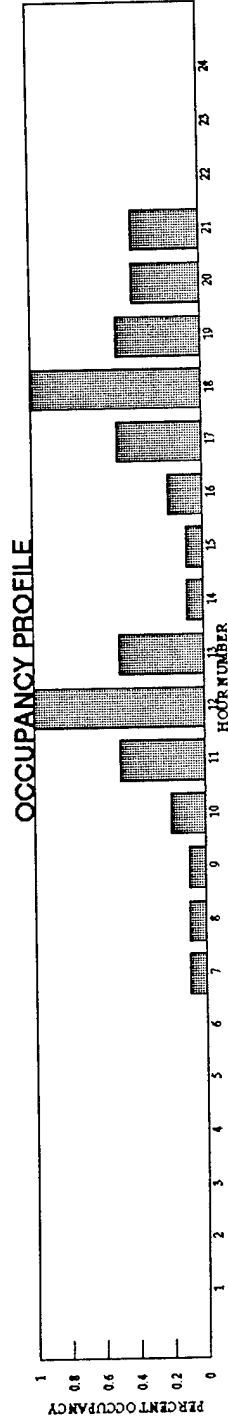
Peak Value for Internal Gains							
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
1	3	62	Television (Color, tube)	300	15%	900	3,072
	1	46	Microwave Oven	600	65%	600	2,048
	1	49	Radio	71	10%	71	242
	1	25	Cold Food/Beverage	1,535	50%	1,535	5,239

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 04 -Feb-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 1721Z1  
 BLDG: 1721  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7	Day Room	OCCUPANCY						0.1	0.1	0.1	0.2	0.5	1	0.5	0.1	0.1	0.2	0.5	1	0.5	0.4	0.4				
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.6	0.6	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	0.1	0.1	0.1
		PROCESS	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.8	0.9	0.8	0.5	0.5	0.7	0.8	0.9	0.8	0.7	0.7	0.5	0.5	0.5



BLDG 1721 - DAYROOM      BASERUN (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995      YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 17278.000000

FLOOR AREA (SQFT) 1920.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 77680.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -96225.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 19200.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 110.000000

INFILTRATION PROFILE

.800	.800	.800	.800	.800	.800	.800	.800
.800	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	.800	.800	.800

A FACTOR IN INFILTRATION EQUATION (CINA) 3.820000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 157.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 16.380000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	-45.00	45.00	135.00	-135.00
WALL AREA SQFT (AWLL)	313.0	539.0	472.0	556.0
WINDOW AREA SQFT (AWND)	60.0	72.0	60.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	6.0	7.2	6.0	.0
WIDTH OF OVERHANG (WOH)	6.8	2.0	6.8	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.110	.110	.110
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00471	.00471	.00471	.00471
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00050	.00050	.00050	.00050
N=3	.00243	.00243	.00243	.00243
N=4	.00162	.00162	.00162	.00162
N=5	.00017	.00017	.00017	.00017
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.73771	-1.73771	-1.73771	-1.73771
N=3	.90936	.90936	.90936	.90936
N=4	-.13373	-.13373	-.13373	-.13373
N=5	.00496	.00496	.00496	.00496
N=6	-.00001	-.00001	-.00001	-.00001
ROOF AREA SQFT (AROF)	1920.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	4.600000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	8.756841E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.886E-05 .130E-02 .487E-02 .240E-02 .177E-03	885.			
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03	999.			
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.200000E-01			

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	KW	BTU/HR		HEATING	COOLING
		LIGHTS	PROCESS	PEOPLE SENSIBLE		
		3.	4452.	5400.	4400.	
		HOURLY FRACTION OF PEAK				
1		.100	.500	.000	.000	70.0 76.0
2		.100	.500	.000	.000	70.0 76.0
3		.100	.500	.000	.000	70.0 76.0
4		.100	.500	.000	.000	70.0 76.0
5		.100	.500	.000	.000	70.0 76.0
6		.100	.500	.000	.000	70.0 76.0
7		.600	.500	.100	.100	70.0 76.0
8		.600	.500	.100	.100	70.0 76.0
9		.600	.500	.100	.100	70.0 76.0
10		1.000	.700	.200	.200	70.0 76.0
11		1.000	.800	.500	.500	70.0 76.0
12		1.000	.900	1.000	1.000	70.0 76.0

13	1.000	.800	.500	.500	70.0	76.0
14	1.000	.500	.100	.100	70.0	76.0
15	1.000	.500	.100	.100	70.0	76.0
16	1.000	.700	.200	.200	70.0	76.0
17	1.000	.800	.500	.500	70.0	76.0
18	1.000	.900	1.000	1.000	70.0	76.0
19	1.000	.800	.500	.500	70.0	76.0
20	1.000	.700	.400	.400	70.0	76.0
21	.600	.700	.400	.400	70.0	76.0
22	.100	.500	.000	.000	70.0	76.0
23	.100	.500	.000	.000	70.0	76.0
24	.100	.500	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					3490.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP (TMXAIR)					70.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.600000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					78000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					97500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					96225.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					17789.000000	
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 1721 - DAYROOM      BASERUN (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR		PARTITN				VENT	
			THRU	ROOF	DOOR	BSMT	WALL	WINDOW	AND	LATENT
			WINDOW		AND				INFL	
				SLAB						
JAN	.00	GAIN	2.72	.00	.00	.00	.00	.00	.00	.00
	-23.76	LOSS		-2.58	-4.58	.00	-4.43	-2.67	-22.10	.00
FEB	.02	GAIN	3.39	.00	.00	.00	.00	.00	.00	.01
	-18.33	LOSS		-2.15	-3.92	.00	-3.35	-2.29	-18.93	.00
MAR	1.06	GAIN	4.40	.01	.00	.00	.11	.00	.00	.13
	-14.47	LOSS		-1.94	-3.65	.00	-2.63	-2.13	-17.58	.00
APR	5.08	GAIN	4.62	.08	.02	.00	.49	.01	.08	.63
	-5.68	LOSS		-1.16	-2.18	.00	-1.22	-1.27	-10.23	.00
MAY	11.25	GAIN	5.07	.20	.07	.00	1.04	.04	.26	2.41
	-1.31	LOSS		-.71	-1.26	.00	-.40	-.71	-5.93	.00
JUN	22.91	GAIN	5.09	.35	.20	.00	1.67	.12	.79	8.85
	-.08	LOSS		-.41	-.61	.00	-.08	-.34	-2.38	.00
JUL	29.97	GAIN	5.28	.53	.52	.00	2.29	.31	2.08	11.49
	-.01	LOSS		-.29	-.38	.00	-.04	-.21	-1.50	.00
AUG	27.93	GAIN	4.67	.43	.39	.00	1.89	.22	1.51	11.49
	-.06	LOSS		-.32	-.42	.00	-.05	-.23	-1.61	.00
SEP	16.27	GAIN	3.76	.19	.20	.00	.99	.12	.82	6.40
	-1.58	LOSS		-.64	-1.02	.00	-.42	-.59	-4.71	.00
OCT	4.57	GAIN	3.17	.03	.03	.00	.22	.02	.11	1.15
	-5.23	LOSS		-1.25	-2.10	.00	-1.44	-1.20	-9.28	.00
NOV	1.18	GAIN	2.51	.00	.00	.00	.03	.00	.00	.23
	-11.45	LOSS		-1.75	-3.00	.00	-2.61	-1.71	-13.54	.00
DEC	.06	GAIN	2.46	.00	.00	.00	.00	.00	.00	.00
	-23.02	LOSS		-2.56	-4.49	.00	-4.46	-2.59	-21.20	.00
TOT	120.	GAIN	47.	2.	1.	0.	9.	1.	6.	43.
	-105.	LOSS		-16.	-28.	0.	-21.	-16.	-129.	0.

MAX HEATING LOAD= -77680. BTUH ON DEC 18 HOUR 9      AMBIENT TEMP 3.  
 MAX COOLING LOAD= 88350. BTUH ON JUL 3 HOUR 12      AMBIENT TEMP 86.

ZONE UA BTU/HR-F

430.5

BEACON Energy Analysis By Energy Systems Engineers, Inc.

1721.I

BLDG 1721 - DAYROOM BASERUN (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	77.	65.	4 27	12 6	63. 4.	1.13	4.86	3.03	9.88
FEB	71.	77.	69.	17 2	13 6	59. 14.	1.02	4.39	2.73	8.93
MAR	71.	78.	69.	12 4	13 6	74. 15.	1.13	4.86	3.03	9.88
APR	73.	78.	69.	30 9	12 5	80. 30.	1.09	4.71	2.93	9.57
MAY	75.	78.	69.	28 11	12 5	85. 39.	1.13	4.86	3.03	9.88
JUN	76.	78.	70.	22 17	12 5	84. 56.	1.09	4.71	2.93	9.57
JUL	77.	78.	70.	3 10	12 5	86. 57.	1.13	4.86	3.03	9.88
AUG	77.	78.	70.	19 25	12 6	87. 51.	1.13	4.86	3.03	9.88
SEP	75.	78.	69.	3 15	12 6	89. 39.	1.09	4.71	2.93	9.57
OCT	73.	78.	69.	5 28	12 5	84. 31.	1.13	4.86	3.03	9.88
NOV	71.	77.	69.	8 3	12 6	74. 18.	1.09	4.71	2.93	9.57
DEC	70.	77.	59.	29 18	17 6	61. 0.	1.13	4.86	3.03	9.88
YEAR							13.32	57.27	35.63	116.38

BLDG 1721 - DAYROOM      BASERUN (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	680	15	14	0	-.7768E+05	.0000
FEB	559	27	0	0	-.7218E+05	.1891E+05
MAR	526	93	0	0	-.7196E+05	.4324E+05
APR	299	227	0	0	-.4481E+05	.4930E+05
MAY	120	379	0	0	-.3044E+05	.6068E+05
JUN	17	511	0	0	-8002.	.8062E+05
JUL	3	625	0	0	-5296.	.8835E+05
AUG	10	608	0	0	-.1238E+05	.8151E+05
SEP	117	428	0	0	-.2914E+05	.8619E+05
OCT	302	220	0	0	-.4204E+05	.6359E+05
NOV	475	93	0	0	-.6188E+05	.4512E+05
DEC	684	15	12	0	-.7768E+05	.1755E+05
YEAR	3792	3241	26	0	-.7768E+05	.8835E+05



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	33.01	.00	1.13	4.86	.89	9.88	3.7
FEB	25.92	.00	1.02	4.39	.80	8.93	5.0
MAR	21.41	.06	1.13	4.86	.89	9.88	5.9
APR	9.54	.28	1.09	4.71	.86	9.57	6.2
MAY	2.89	.59	1.13	4.86	.89	9.88	6.8
JUN	.32	1.18	1.09	4.71	.86	9.57	7.9
JUL	.06	1.55	1.13	4.86	.89	9.88	8.4
AUG	.20	1.44	1.13	4.86	.89	9.88	8.0
SEP	3.04	.85	1.09	4.71	.86	9.57	8.3
OCT	9.07	.26	1.13	4.86	.89	9.88	6.9
NOV	17.58	.08	1.09	4.71	.86	9.57	6.0
DEC	32.36	.00	1.13	4.86	.89	9.88	5.0
YEAR	155.39	6.31	13.32	57.27	10.44	116.38	8.4

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 164214. BTU/(SQFT-YEAR)

BLDG 1721 - DAYROOM      BASERUN (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	DAY	DAY		+	-	COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0 0	.0000	-.7768E+05
FEB	1421.	901.	1.000	37.	0.	0.	0 0	.1891E+05	-.7218E+05
MAR	1864.	1216.	1.000	43.	0.	0.	0 0	.4324E+05	-.7196E+05
APR	2242.	1552.	1.000	55.	0.	0.	0 0	.4930E+05	-.4481E+05
MAY	2489.	1771.	1.000	65.	0.	0.	0 0	.6068E+05	-.3044E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0 0	.8062E+05	-8002.
JUL	2470.	1954.	1.000	77.	0.	0.	0 0	.8835E+05	-5296.
AUG	2211.	1784.	1.000	76.	0.	0.	0 0	.8151E+05	-.1238E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0 0	.8619E+05	-.2914E+05
OCT	1394.	924.	1.000	57.	0.	0.	0 0	.6359E+05	-.4204E+05
NOV	1008.	710.	1.000	47.	0.	0.	0 0	.4512E+05	-.6188E+05
DEC	856.	586.	1.000	35.	0.	0.	0 0	.1755E+05	-.7768E+05

BLDG 1721 - DAYROOM NIGHT SETBACK (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (ALL) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 17278.000000

FLOOR AREA (SQFT) 1920.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 77680.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -96225.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 19200.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 110.000000

INFILTRATION PROFILE

.800	.800	.800	.800	.800	.800	.800	.800
.800	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	.800	.800	.800

A FACTOR IN INFILTRATION EQUATION (CINA) 3.820000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 157.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 16.380000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	-45.00	45.00	135.00	-135.00
WALL AREA SQFT (AWLL)	313.0	539.0	472.0	556.0
WINDOW AREA SQFT (AWND)	60.0	72.0	60.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	6.0	7.2	6.0	.0
WIDTH OF OVERHANG (WOH)	6.8	2.0	6.8	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.110	.110	.110
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00471	.00471	.00471	.00471
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00050	.00050	.00050	.00050
N=3	.00243	.00243	.00243	.00243
N=4	.00162	.00162	.00162	.00162
N=5	.00017	.00017	.00017	.00017
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.73771	-1.73771	-1.73771	-1.73771
N=3	.90936	.90936	.90936	.90936
N=4	-.13373	-.13373	-.13373	-.13373
N=5	.00496	.00496	.00496	.00496
N=6	-.00001	-.00001	-.00001	-.00001
ROOF AREA SQFT (AROF)	1920.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	4.600000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	8.756841E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.886E-05 .130E-02 .487E-02 .240E-02 .177E-03	885.			
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03	999.			
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)		1.292998		
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)		1.292998		
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)		4.200000E-01		
WEEKEND COOLING THERMOSTAT PROFILE				
90.0	90.0	90.0	90.0	90.0
76.0	76.0	76.0	76.0	76.0
76.0	76.0	76.0	76.0	90.0
76.0	76.0	76.0	76.0	90.0
WEEKEND HEATING THERMOSTAT PROFILE				
55.0	55.0	55.0	55.0	55.0
70.0	70.0	70.0	70.0	70.0
70.0	70.0	70.0	70.0	55.0

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET	
					POINT DEG F	
KW	BTU/HR					
	PEOPLE					
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING	

PEAK VAL	3.	4452.	5400.	4400.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.500	.000	.000	55.0		90.0
2	.100	.500	.000	.000	55.0		90.0
3	.100	.500	.000	.000	55.0		90.0
4	.100	.500	.000	.000	55.0		90.0
5	.100	.500	.000	.000	55.0		90.0
6	.100	.500	.000	.000	55.0		90.0
7	.600	.500	.100	.100	70.0		76.0
8	.600	.500	.100	.100	70.0		76.0
9	.600	.500	.100	.100	70.0		76.0
10	1.000	.700	.200	.200	70.0		76.0
11	1.000	.800	.500	.500	70.0		76.0
12	1.000	.900	1.000	1.000	70.0		76.0
13	1.000	.800	.500	.500	70.0		76.0
14	1.000	.500	.100	.100	70.0		76.0
15	1.000	.500	.100	.100	70.0		76.0
16	1.000	.700	.200	.200	70.0		76.0
17	1.000	.800	.500	.500	70.0		76.0
18	1.000	.900	1.000	1.000	70.0		76.0
19	1.000	.800	.500	.500	70.0		76.0
20	1.000	.700	.400	.400	70.0		76.0
21	.600	.700	.400	.400	70.0		76.0
22	.100	.500	.000	.000	55.0		90.0
23	.100	.500	.000	.000	55.0		90.0
24	.100	.500	.000	.000	55.0		90.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					3490.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.600000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					78000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					97500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					96225.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					17789.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400	.370
.500	.450	.600	.550	.700	.650	.800	.760
.900	.880	1.00	1.00				

BLDG 1721 - DAYROOM NIGHT SETBACK (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	2.72	.00	.00	.00	.00	.00	.00	.00
	-18.18	LOSS		-2.25	-3.93	.00	-3.65	-2.29	-18.74	.00
FEB	.02	GAIN	3.39	.00	.00	.00	.00	.00	.00	.01
	-13.51	LOSS		-1.85	-3.34	.00	-2.66	-1.95	-16.01	.00
MAR	1.08	GAIN	4.40	.01	.00	.00	.13	.00	.00	.13
	-9.92	LOSS		-1.65	-3.09	.00	-1.99	-1.81	-14.86	.00
APR	5.09	GAIN	4.62	.08	.02	.00	.53	.01	.08	.62
	-3.22	LOSS		-.99	-1.85	.00	-.86	-1.09	-8.76	.00
MAY	11.10	GAIN	5.07	.21	.07	.00	1.07	.04	.26	2.32
	-.50	LOSS		-.66	-1.16	.00	-.30	-.65	-5.52	.00
JUN	21.10	GAIN	5.09	.35	.20	.00	1.60	.12	.79	7.57
	-.01	LOSS		-.44	-.67	.00	-.09	-.38	-2.62	.00
JUL	25.37	GAIN	5.28	.52	.51	.00	2.07	.30	2.03	8.33
	.00	LOSS		-.38	-.56	.00	-.05	-.32	-2.23	.00
AUG	23.74	GAIN	4.67	.42	.39	.00	1.72	.22	1.51	8.43
	-.02	LOSS		-.40	-.58	.00	-.06	-.32	-2.21	.00
SEP	14.74	GAIN	3.76	.19	.20	.00	.95	.12	.81	5.30
	-.65	LOSS		-.61	-.96	.00	-.32	-.55	-4.44	.00
OCT	4.54	GAIN	3.17	.04	.03	.00	.24	.02	.11	1.09
	-2.73	LOSS		-1.08	-1.76	.00	-1.07	-1.01	-7.86	.00
NOV	1.21	GAIN	2.51	.00	.00	.00	.04	.00	.00	.23
	-7.71	LOSS		-1.51	-2.52	.00	-2.05	-1.44	-11.35	.00
DEC	.07	GAIN	2.46	.00	.00	.00	.00	.00	.00	.00
	-17.52	LOSS		-2.23	-3.83	.00	-3.66	-2.21	-17.87	.00
TOT	108.	GAIN	47.	2.	1.	0.	8.	1.	6.	34.
	-74.	LOSS		-14.	-24.	0.	-17.	-14.	-112.	0.

MAX HEATING LOAD= -77680. BTUH ON DEC 28 HOUR 7 AMBIENT TEMP 27.  
 MAX COOLING LOAD= 87685. BTUH ON JUL 3 HOUR 12 AMBIENT TEMP 86.

ZONE UA BTU/HR-F

430.5

BEACON Energy Analysis By Energy Systems Engineers, Inc.

1721-2.1

BLDG 1721 - DAYROOM NIGHT SETBACK (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	65.	77.	54.	4 27	12 6	63. 4.	1.13	4.86	3.03	9.88
FEB	66.	77.	54.	17 2	13 6	59. 14.	1.02	4.39	2.73	8.93
MAR	67.	78.	54.	12 4	13 6	74. 15.	1.13	4.86	3.03	9.88
APR	71.	78.	55.	30 9	12 5	80. 30.	1.09	4.71	2.93	9.57
MAY	74.	79.	55.	31 11	24 5	69. 39.	1.13	4.86	3.03	9.88
JUN	77.	83.	66.	29 17	1 6	73. 57.	1.09	4.71	2.93	9.57
JUL	78.	89.	68.	16 10	3 6	80. 60.	1.13	4.86	3.03	9.88
AUG	78.	85.	64.	1 25	3 6	75. 51.	1.13	4.86	3.03	9.88
SEP	75.	84.	55.	3 15	2 6	74. 39.	1.09	4.71	2.93	9.57
OCT	71.	78.	55.	5 28	1 5	69. 31.	1.13	4.86	3.03	9.88
NOV	68.	77.	54.	8 3	12 6	74. 18.	1.09	4.71	2.93	9.57
DEC	65.	77.	54.	23 18	13 6	71. 0.	1.13	4.86	3.03	9.88
YEAR							13.32	57.27	35.63	116.38

BLDG 1721 - DAYROOM NIGHT SETBACK (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	614	16	20	0	-.7768E+05	.0000
FEB	486	32	16	0	-.7768E+05	.1971E+05
MAR	409	97	10	0	-.7768E+05	.4353E+05
APR	175	225	0	0	-.7462E+05	.4926E+05
MAY	37	368	0	0	-.5404E+05	.6064E+05
JUN	2	432	0	0	-4632.	.8004E+05
JUL	0	454	0	0	.0000	.8769E+05
AUG	2	451	0	0	-.1807E+05	.8075E+05
SEP	34	365	0	0	-.5729E+05	.8546E+05
OCT	161	222	0	0	-.7222E+05	.6356E+05
NOV	358	99	5	0	-.7768E+05	.4513E+05
DEC	605	16	22	0	-.7768E+05	.2047E+05
YEAR	2883	2777	73	0	-.7768E+05	.8769E+05



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	26.38	.00	1.13	4.86	.89	9.88	3.7
FEB	20.03	.00	1.02	4.39	.80	8.93	5.1
MAR	15.30	.06	1.13	4.86	.89	9.88	5.9
APR	5.50	.28	1.09	4.71	.86	9.57	6.2
MAY	.98	.58	1.13	4.86	.89	9.88	6.8
JUN	.04	1.07	1.09	4.71	.86	9.57	7.9
JUL	.00	1.29	1.13	4.86	.89	9.88	8.4
AUG	.05	1.20	1.13	4.86	.89	9.88	7.9
SEP	1.10	.76	1.09	4.71	.86	9.57	8.3
OCT	4.87	.26	1.13	4.86	.89	9.88	6.9
NOV	12.36	.08	1.09	4.71	.86	9.57	6.0
DEC	25.64	.00	1.13	4.86	.89	9.88	5.1
YEAR	112.26	5.58	13.32	57.27	10.44	116.38	8.4

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 140450. BTU/(SQFT-YEAR)

BLDG 1721 - DAYROOM NIGHT SETBACK (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT.	MAX TEMP.	SYSTEM DRIFT	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD	MAXIMUM HEATING LOAD
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY		DEG. F	DEG. F + -	COOL	HEAT	BTU	BTU	
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.7768E+05
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.1971E+05	-.7768E+05
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.4353E+05	-.7768E+05
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.4926E+05	-.7462E+05
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.6064E+05	-.5404E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.8004E+05	-4632.
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8769E+05	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.8075E+05	-.1807E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8546E+05	-.5729E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.6356E+05	-.7222E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.4513E+05	-.7768E+05
DEC	856.	586.	1.000	35.	0.	0.	0	0	.2047E+05	-.7768E+05

BLDG 1721 - DAYROOM DDC (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (ALL) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 17278.000000

FLOOR AREA (SQFT) 1920.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 77680.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -96225.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 19200.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 110.000000

## INFILTRATION PROFILE

.800	.800	.800	.800	.800	.800	.800	.800
.800	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	.800	.800	.800

A FACTOR IN INFILTRATION EQUATION (CINA) 3.820000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 157.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 16.380000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	-45.00	45.00	135.00	-135.00
WALL AREA SQFT (AWLL)	313.0	539.0	472.0	556.0
WINDOW AREA SQFT (AWND)	60.0	72.0	60.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	6.0	7.2	6.0	.0
WIDTH OF OVERHANG (WOH)	6.8	2.0	6.8	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.110	.110	.110
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00471	.00471	.00471	.00471
NUMBER OF BN FACTORS (NB)	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00050	.00050	.00050	.00050
N=3	.00243	.00243	.00243	.00243
N=4	.00162	.00162	.00162	.00162
N=5	.00017	.00017	.00017	.00017
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.73771	-1.73771	-1.73771	-1.73771
N=3	.90936	.90936	.90936	.90936
N=4	-.13373	-.13373	-.13373	-.13373
N=5	.00496	.00496	.00496	.00496
N=6	-.00001	-.00001	-.00001	-.00001
ROOF AREA SQFT (AROF)	1920.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	4.600000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	8.756841E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.886E-05 .130E-02 .487E-02 .240E-02 .177E-03	885.			
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03	999.			
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.200000E-01			
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0	78.0	78.0		
78.0 78.0 78.0 78.0 78.0 78.0	78.0	78.0		
78.0 78.0 78.0 78.0 78.0 90.0	90.0	90.0		
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0	68.0	68.0		
68.0 68.0 68.0 68.0 68.0 68.0	68.0	68.0		
68.0 68.0 68.0 68.0 68.0 55.0	55.0	55.0		

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

KW	-----	BTU/HR	-----	
		PEOPLE	PEOPLE	
LIGHTS	PROCESS	SENSIBLE	LATENT	
	HEATING	COOLING		

PEAK VAL	3.	4452.	5400.	4400.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.500	.000	.000	55.0		90.0
2	.100	.500	.000	.000	55.0		90.0
3	.100	.500	.000	.000	55.0		90.0
4	.100	.500	.000	.000	55.0		90.0
5	.100	.500	.000	.000	55.0		90.0
6	.100	.500	.000	.000	55.0		90.0
7	.600	.500	.100	.100	68.0		78.0
8	.600	.500	.100	.100	68.0		78.0
9	.600	.500	.100	.100	68.0		78.0
10	1.000	.700	.200	.200	68.0		78.0
11	1.000	.800	.500	.500	68.0		78.0
12	1.000	.900	1.000	1.000	68.0		78.0
13	1.000	.800	.500	.500	68.0		78.0
14	1.000	.500	.100	.100	68.0		78.0
15	1.000	.500	.100	.100	68.0		78.0
16	1.000	.700	.200	.200	68.0		78.0
17	1.000	.800	.500	.500	68.0		78.0
18	1.000	.900	1.000	1.000	68.0		78.0
19	1.000	.800	.500	.500	68.0		78.0
20	1.000	.700	.400	.400	68.0		78.0
21	.600	.700	.400	.400	68.0		78.0
22	.100	.500	.000	.000	55.0		90.0
23	.100	.500	.000	.000	55.0		90.0
24	.100	.500	.000	.000	55.0		90.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					3490.000000		
ECONOMIZER HIGH TEMP LIMIT F					65.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.600000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					78000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					97500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					96225.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					17789.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400	.370
.500	.450	.600	.550	.700	.650	.800	.760
.900	.880	1.00	1.00				

BLDG 1721 - DAYROOM DDC (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	2.72	.00	.00	.00	.00	.00	.00	.00
	-16.95	LOSS		-2.18	-3.79	.00	-3.49	-2.21	-17.95	.00
FEB	.02	GAIN	3.39	.00	.00	.00	.00	.00	.00	.01
	-12.54	LOSS		-1.80	-3.24	.00	-2.55	-1.90	-15.36	.00
MAR	.96	GAIN	4.40	.01	.00	.00	.11	.00	.00	.13
	-9.06	LOSS		-1.62	-3.03	.00	-1.90	-1.77	-14.30	.00
APR	4.59	GAIN	4.62	.07	.01	.00	.46	.01	.04	.59
	-2.79	LOSS		-1.00	-1.89	.00	-.85	-1.11	-8.63	.00
MAY	10.18	GAIN	5.07	.17	.04	.00	.95	.02	.13	2.25
	-.37	LOSS		-.69	-1.26	.00	-.34	-.71	-5.68	.00
JUN	19.68	GAIN	5.09	.30	.13	.00	1.44	.08	.51	7.35
	.00	LOSS		-.47	-.76	.00	-.12	-.43	-2.97	.00
JUL	23.99	GAIN	5.28	.46	.40	.00	1.88	.23	1.57	8.22
	.00	LOSS		-.42	-.62	.00	-.07	-.36	-2.45	.00
AUG	22.36	GAIN	4.67	.37	.29	.00	1.54	.16	1.10	8.30
	-.01	LOSS		-.43	-.65	.00	-.09	-.36	-2.45	.00
SEP	13.58	GAIN	3.76	.16	.14	.00	.83	.09	.59	5.10
	-.52	LOSS		-.65	-1.04	.00	-.36	-.60	-4.62	.00
OCT	4.05	GAIN	3.17	.03	.02	.00	.20	.01	.06	1.05
	-2.33	LOSS		-1.10	-1.80	.00	-1.08	-1.03	-7.71	.00
NOV	1.02	GAIN	2.51	.00	.00	.00	.03	.00	.00	.22
	-6.95	LOSS		-1.48	-2.48	.00	-1.99	-1.42	-10.90	.00
DEC	.05	GAIN	2.46	.00	.00	.00	.00	.00	.00	.00
	-16.32	LOSS		-2.16	-3.70	.00	-3.51	-2.13	-17.13	.00
TOT	100.	GAIN	47.	2.	1.	0.	7.	1.	4.	33.
	-68.	LOSS		-14.	-24.	0.	-16.	-14.	-110.	0.

MAX HEATING LOAD= -77680. BTUH ON DEC 28 HOUR 7 AMBIENT TEMP 27.  
 MAX COOLING LOAD= 85094. BTUH ON JUL 3 HOUR 12 AMBIENT TEMP 86.

ZONE UA BTU/HR-F

430.5

BEACON Energy Analysis By Energy Systems Engineers, Inc.

1721-1.I

BLDG 1721 - DAYROOM DDC (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	64.	79.	54.	3 27	15 6	63. 4.	1.13	4.86	3.03	9.88
FEB	65.	79.	54.	17 2	13 6	59. 14.	1.02	4.39	2.73	8.93
MAR	67.	80.	54.	12 4	13 6	74. 15.	1.13	4.86	3.03	9.88
APR	71.	80.	55.	30 9	12 5	80. 30.	1.09	4.71	2.93	9.57
MAY	75.	80.	55.	31 11	23 5	71. 39.	1.13	4.86	3.03	9.88
JUN	78.	84.	66.	29 17	1 6	73. 57.	1.09	4.71	2.93	9.57
JUL	80.	89.	68.	16 10	3 6	80. 60.	1.13	4.86	3.03	9.88
AUG	79.	85.	64.	1 25	2 6	75. 51.	1.13	4.86	3.03	9.88
SEP	76.	85.	55.	3 15	1 6	76. 39.	1.09	4.71	2.93	9.57
OCT	71.	80.	55.	5 28	12 5	84. 31.	1.13	4.86	3.03	9.88
NOV	67.	79.	54.	8 3	12 6	74. 18.	1.09	4.71	2.93	9.57
DEC	64.	79.	54.	12 18	16 6	59. 0.	1.13	4.86	3.03	9.88
YEAR							13.32	57.27	35.63	116.38

BLDG 1721 - DAYROOM DDC (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	608	10	13	0	-.7768E+05	.0000
FEB	468	18	11	0	-.7768E+05	.1762E+05
MAR	397	76	4	0	-.7768E+05	.4078E+05
APR	161	204	0	0	-.6694E+05	.4686E+05
MAY	31	347	0	0	-.4659E+05	.5837E+05
JUN	0	414	0	0	.0000	.7752E+05
JUL	0	446	0	0	.0000	.8509E+05
AUG	1	441	0	0	-.1085E+05	.7823E+05
SEP	31	339	0	0	-.4987E+05	.8270E+05
OCT	145	186	0	0	-.6459E+05	.6113E+05
NOV	344	77	2	0	-.7768E+05	.4303E+05
DEC	595	8	14	0	-.7768E+05	.1327E+05
YEAR	2781	2566	44	0	-.7768E+05	.8509E+05



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	25.02	.00	1.13	4.86	.89	9.88	3.7
FEB	18.76	.00	1.02	4.39	.80	8.93	5.0
MAR	14.30	.06	1.13	4.86	.89	9.88	5.8
APR	4.87	.26	1.09	4.71	.86	9.57	6.0
MAY	.77	.54	1.13	4.86	.89	9.88	6.6
JUN	.00	1.00	1.09	4.71	.86	9.57	7.7
JUL	.00	1.22	1.13	4.86	.89	9.88	8.2
AUG	.02	1.13	1.13	4.86	.89	9.88	7.8
SEP	.93	.70	1.09	4.71	.86	9.57	8.1
OCT	4.25	.24	1.13	4.86	.89	9.88	6.8
NOV	11.41	.07	1.09	4.71	.86	9.57	5.9
DEC	24.29	.00	1.13	4.86	.89	9.88	4.9
YEAR	104.62	5.21	13.32	57.27	10.44	116.38	8.2

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 135819. BTU/(SQFT-YEAR)

BLDG 1721 - DAYROOM DDC (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	HORIZ. SURF. BTU/ SQFT- DAY	HORIZ. SURF. BTU/ SQFT- DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.7768E+05
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.1762E+05	-.7768E+05
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.4078E+05	-.7768E+05
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.4686E+05	-.6694E+05
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.5837E+05	-.4659E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.7752E+05	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8509E+05	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.7823E+05	-.1085E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8270E+05	-.4987E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.6113E+05	-.6459E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.4303E+05	-.7768E+05
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1327E+05	-.7768E+05

BLDG 1721 - DAYROOM ECONOMIZER (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 3  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 17278.000000

FLOOR AREA (SQFT) 1920.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 77680.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -96225.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 19200.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 110.000000

INFILTRATION PROFILE

.800	.800	.800	.800	.800	.800	.800	.800
.800	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	.800	.800	.800

A FACTOR IN INFILTRATION EQUATION (CINA) 3.820000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 157.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 16.380000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	-45.00	45.00	135.00	-135.00
WALL AREA SQFT (AWLL)	313.0	539.0	472.0	556.0
WINDOW AREA SQFT (AWND)	60.0	72.0	60.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	6.0	7.2	6.0	.0
WIDTH OF OVERHANG (WOH)	6.8	2.0	6.8	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.110	.110	.110
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00471	.00471	.00471	.00471
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00050	.00050	.00050	.00050
N=3	.00243	.00243	.00243	.00243
N=4	.00162	.00162	.00162	.00162
N=5	.00017	.00017	.00017	.00017
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.73771	-1.73771	-1.73771	-1.73771
N=3	.90936	.90936	.90936	.90936
N=4	-.13373	-.13373	-.13373	-.13373
N=5	.00496	.00496	.00496	.00496
N=6	-.00001	-.00001	-.00001	-.00001
ROOF AREA SQFT (AROF)	1920.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	4.600000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	8.756841E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.886E-05 .130E-02 .487E-02 .240E-02 .177E-03	885.			
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03	999.			
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)		1		1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)		1		1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.200000E-01			
WEEKEND COOLING THERMOSTAT PROFILE				
90.0 90.0 90.0 90.0 90.0 90.0 78.0 78.0				
78.0 78.0 78.0 78.0 78.0 78.0 78.0 78.0				
78.0 78.0 78.0 78.0 78.0 90.0 90.0 90.0				
WEEKEND HEATING THERMOSTAT PROFILE				
55.0 55.0 55.0 55.0 55.0 55.0 68.0 68.0				
68.0 68.0 68.0 68.0 68.0 68.0 68.0 68.0				
68.0 68.0 68.0 68.0 68.0 55.0 55.0 55.0				

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
KW	BTU/HR					
	PEOPLE	PEOPLE				
LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING	

PEAK VAL	3.	4452.	5400.	4400.			
HOUR	HOURLY FRACTION OF PEAK						
1	.100	.500	.000	.000	55.0	90.0	
2	.100	.500	.000	.000	55.0	90.0	
3	.100	.500	.000	.000	55.0	90.0	
4	.100	.500	.000	.000	55.0	90.0	
5	.100	.500	.000	.000	55.0	90.0	
6	.100	.500	.000	.000	55.0	90.0	
7	.600	.500	.100	.100	68.0	78.0	
8	.600	.500	.100	.100	68.0	78.0	
9	.600	.500	.100	.100	68.0	78.0	
10	1.000	.700	.200	.200	68.0	78.0	
11	1.000	.800	.500	.500	68.0	78.0	
12	1.000	.900	1.000	1.000	68.0	78.0	
13	1.000	.800	.500	.500	68.0	78.0	
14	1.000	.500	.100	.100	68.0	78.0	
15	1.000	.500	.100	.100	68.0	78.0	
16	1.000	.700	.200	.200	68.0	78.0	
17	1.000	.800	.500	.500	68.0	78.0	
18	1.000	.900	1.000	1.000	68.0	78.0	
19	1.000	.800	.500	.500	68.0	78.0	
20	1.000	.700	.400	.400	68.0	78.0	
21	.600	.700	.400	.400	68.0	78.0	
22	.100	.500	.000	.000	55.0	90.0	
23	.100	.500	.000	.000	55.0	90.0	
24	.100	.500	.000	.000	55.0	90.0	
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000		
SYSTEM TYPE, (IECN)					2		
SUPPLY AIR CFM (SACFM)					3490.000000		
ECONOMIZER HIGH TEMP LIMIT F					75.000000		
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR					24.000000		
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01		
FAN EFFICIENCY (EFAN)					5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)					1.600000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)					78000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)					97500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)							
.100	.191	.200	.286	.300	.369	.400	.451
.500	.537	.600	.625	.700	.718	.800	.812
.900	.906	1.00	1.00				
CHILLER TYPE (ITYPCH)					0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)					96225.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)					17789.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)							
.100	.200	.200	.250	.300	.310	.400	.370
.500	.450	.600	.550	.700	.650	.800	.760
.900	.880	1.00	1.00				

BLDG 1721 - DAYROOM ECONOMIZER (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH	LOAD		SOLAR THRU WINDOW	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
JAN	.00	GAIN	2.72	.00	.00	.00	.00	.00	.00	.00
	-16.95	LOSS		-2.18	-3.79	.00	-3.49	-2.21	-17.95	.00
FEB	.00	GAIN	3.39	.00	.00	.00	.00	.00	.00	.00
	-12.54	LOSS		-1.80	-3.24	.00	-2.55	-1.90	-15.37	.00
MAR	.35	GAIN	4.40	.01	.00	.00	.11	.00	.00	.11
	-9.06	LOSS		-1.62	-3.03	.00	-1.90	-1.77	-14.89	.00
APR	3.42	GAIN	4.62	.07	.01	.00	.46	.01	.04	1.40
	-2.79	LOSS		-1.00	-1.89	.00	-.85	-1.11	-10.60	.00
MAY	9.50	GAIN	5.07	.17	.04	.00	.95	.02	.13	3.91
	-.37	LOSS		-.69	-1.26	.00	-.34	-.71	-8.02	.00
JUN	19.94	GAIN	5.09	.30	.13	.00	1.41	.08	.51	10.14
	.00	LOSS		-.48	-.79	.00	-.13	-.45	-5.41	.00
JUL	24.19	GAIN	5.28	.46	.39	.00	1.85	.23	1.56	10.03
	.00	LOSS		-.43	-.66	.00	-.08	-.38	-3.93	.00
AUG	22.83	GAIN	4.67	.36	.29	.00	1.49	.16	1.10	10.59
	-.01	LOSS		-.46	-.71	.00	-.12	-.40	-4.07	.00
SEP	13.20	GAIN	3.76	.16	.14	.00	.82	.09	.59	6.81
	-.52	LOSS		-.65	-1.06	.00	-.37	-.61	-6.63	.00
OCT	3.02	GAIN	3.17	.03	.02	.00	.20	.01	.06	1.47
	-2.33	LOSS		-1.10	-1.80	.00	-1.08	-1.03	-9.15	.00
NOV	.33	GAIN	2.51	.00	.00	.00	.03	.00	.00	.20
	-6.95	LOSS		-1.48	-2.48	.00	-1.99	-1.42	-11.57	.00
DEC	.00	GAIN	2.46	.00	.00	.00	.00	.00	.00	.00
	-16.32	LOSS		-2.16	-3.70	.00	-3.51	-2.13	-17.18	.00
TOT	96.78	GAIN	47.13	1.55	1.02	.00	7.31	.59	4.00	44.64
	-67.85	LOSS		-14.07	-24.42	.00	-16.41	-14.10	-124.77	.00

MAX HEATING LOAD= -77680. BTUH ON DEC 28 HOUR 7      AMBIENT TEMP 27.  
 MAX COOLING LOAD= 96225. BTUH ON OCT 15 HOUR 12      AMBIENT TEMP 71.

ZONE UA BTU/HR-F

430.5

BEACON Energy Analysis By Energy Systems Engineers, Inc.

1721-3.I

BLDG 1721 - DAYROOM ECONOMIZER (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	64.	79.	54.	3 27	15 6	63. 4.	1.13	4.86	3.03	9.88
FEB	65.	79.	54.	17 2	13 6	59. 14.	1.02	4.39	2.73	8.93
MAR	67.	80.	54.	12 4	13 6	74. 15.	1.13	4.86	3.03	9.88
APR	71.	80.	55.	30 9	12 5	80. 30.	1.09	4.71	2.93	9.57
MAY	75.	80.	55.	31 11	23 5	71. 39.	1.13	4.86	3.03	9.88
JUN	78.	91.	66.	23 17	10 6	74. 57.	1.09	4.71	2.93	9.57
JUL	80.	93.	68.	30 10	21 6	75. 60.	1.13	4.86	3.03	9.88
AUG	80.	96.	64.	21 25	11 6	75. 51.	1.13	4.86	3.03	9.88
SEP	76.	90.	55.	4 15	14 6	74. 39.	1.09	4.71	2.93	9.57
OCT	71.	82.	55.	5 28	15 5	73. 31.	1.13	4.86	3.03	9.88
NOV	67.	79.	54.	8 3	12 6	74. 18.	1.09	4.71	2.93	9.57
DEC	64.	79.	54.	12 18	16 6	59. 0.	1.13	4.86	3.03	9.88
YEAR							13.32	57.27	35.63	116.38

BLDG 1721 - DAYROOM ECONOMIZER (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	608	10	13	0	-.7768E+05	.0000
FEB	468	18	11	0	-.7768E+05	.0000
MAR	397	76	4	0	-.7768E+05	.6038E+05
APR	161	204	0	0	-.6694E+05	.7343E+05
MAY	31	347	0	1	-.4659E+05	.9623E+05
JUN	0	414	0	32	.0000	.9623E+05
JUL	0	447	0	22	.0000	.9623E+05
AUG	1	442	0	27	-.1085E+05	.9623E+05
SEP	31	339	0	19	-.4987E+05	.9623E+05
OCT	145	186	0	2	-.6459E+05	.9623E+05
NOV	344	77	2	0	-.7768E+05	.6216E+05
DEC	595	8	14	0	-.7768E+05	.0000
YEAR	2781	2568	44	103	-.7768E+05	.9623E+05



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU			
JAN	25.02	.00	1.13	4.86	.89	9.88	3.7
FEB	18.76	.00	1.02	4.39	.80	8.93	3.7
MAR	14.30	.02	1.13	4.86	.89	9.88	6.8
APR	4.87	.18	1.09	4.71	.86	9.57	7.5
MAY	.77	.49	1.13	4.86	.89	9.88	8.8
JUN	.00	1.01	1.09	4.71	.86	9.57	9.0
JUL	.00	1.23	1.13	4.86	.89	9.88	9.0
AUG	.02	1.15	1.13	4.86	.89	9.88	9.0
SEP	.93	.68	1.09	4.71	.86	9.57	9.0
OCT	4.25	.16	1.13	4.86	.89	9.88	9.0
NOV	11.41	.02	1.09	4.71	.86	9.57	6.9
DEC	24.29	.00	1.13	4.86	.89	9.88	3.7
YEAR	104.62	4.95	13.32	57.27	10.44	116.38	9.0

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 135354. BTU/(SQFT-YEAR)

BLDG 1721 - DAYROOM ECONOMIZER (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY	ACTUAL SOLAR	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	INSOL. SURF. BTU/ SQFT- DAY	INSOL. SURF. BTU/ SQFT- DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.7768E+05
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.0000	-.7768E+05
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.6038E+05	-.7768E+05
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.7343E+05	-.6694E+05
MAY	2489.	1771.	1.000	65.	0.	0.	1	0	.9623E+05	-.4659E+05
JUN	2567.	1933.	1.000	72.	0.	0.	32	0	.9623E+05	.0000
JUL	2470.	1954.	1.000	77.	0.	0.	22	0	.9623E+05	.0000
AUG	2211.	1784.	1.000	76.	0.	0.	27	0	.9623E+05	-.1085E+05
SEP	1800.	1330.	1.000	68.	0.	0.	19	0	.9623E+05	-.4987E+05
OCT	1394.	924.	1.000	57.	0.	0.	2	0	.9623E+05	-.6459E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.6216E+05	-.7768E+05
DEC	856.	586.	1.000	35.	0.	0.	0	0	.0000	-.7768E+05

BLDG 1721 - DAYROOM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 17278.000000

FLOOR AREA (SQFT) 1920.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 77680.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMA) -96225.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 19200.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 110.000000

INFILTRATION PROFILE

.000	.000	.000	.000	.000	.000	.000	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
.000	.000	.000	.000	.000	.000	.000	.000

A FACTOR IN INFILTRATION EQUATION (CINA) 3.820000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 157.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 16.380000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNUO) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	-45.00	45.00	135.00	-135.00
WALL AREA SQFT (AWLL)	313.0	539.0	472.0	556.0
WINDOW AREA SQFT (AWND)	60.0	72.0	60.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	6.0	7.2	6.0	.0
WIDTH OF OVERHANG (WOH)	6.8	2.0	6.8	.0
OVERHANG HGT ABV WNDW(HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.110	.110	.110
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00471	.00471	.00471	.00471
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00050	.00050	.00050	.00050
N=3	.00243	.00243	.00243	.00243
N=4	.00162	.00162	.00162	.00162
N=5	.00017	.00017	.00017	.00017
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.73771	-1.73771	-1.73771	-1.73771
N=3	.90936	.90936	.90936	.90936
N=4	-.13373	-.13373	-.13373	-.13373
N=5	.00496	.00496	.00496	.00496
N=6	-.00001	-.00001	-.00001	-.00001
ROOF AREA SQFT (AROF)	1920.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	4.600000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)				1
ROOF C TRANSFER FUNCTION (CNR)	8.756841E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
	.886E-05	.130E-02	.487E-02	.240E-02
			.177E-03	885.
ROOF D TRANSFER FUNCTIONS (DNR)				
	1.00	-1.18	.410	-.444E-01
				.500E-03
				999.
SKYLIGHT TILT DEGREES (TILT)				0.000000E+00
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)				9999.000000
SKYLIGHT HEIGHT FT (SKH)				0.000000E+00
SKYLIGHT WIDTH FT (SKW)				0.000000E+00
SKYLIGHT OVERHANG WIDTH FT (SKOW)				0.000000E+00
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)				0.000000E+00
SKYLIGHT GLASS NUMBER (NS)				1
SKYLIGHT SHADING COEFFICIENT (SHSK)				0.000000E+00
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)				1 1
SUMMER END MONTH AND DAY FOR SHSK (MND,NDND)				1 1
SKY LIGHT AREA SQFT (ASKY)				0.000000E+00
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)				1.292998
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)				1.292998
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)				4.200000E-01

-----INTERNAL GAINS AND PROFILES -----

					THERMOSTAT SET POINT DEG F	
					HEATING	COOLING
	KW	---	BTU/HR	---		
			PEOPLE	PEOPLE		
	LIGHTS	PROCESS	SENSIBLE	LATENT		
PEAK VAL	3.	4452.	5400.	4400.		
HOUR	HOURLY FRACTION OF PEAK					
1	.100	.500	.000	.000	70.0	76.0
2	.100	.500	.000	.000	70.0	76.0
3	.100	.500	.000	.000	70.0	76.0
4	.100	.500	.000	.000	70.0	76.0
5	.100	.500	.000	.000	70.0	76.0
6	.100	.500	.000	.000	70.0	76.0
7	.600	.500	.100	.100	70.0	76.0
8	.600	.500	.100	.100	70.0	76.0
9	.600	.500	.100	.100	70.0	76.0
10	1.000	.700	.200	.200	70.0	76.0
11	1.000	.800	.500	.500	70.0	76.0
12	1.000	.900	1.000	1.000	70.0	76.0

13	1.000	.800	.500	.500	70.0	76.0
14	1.000	.500	.100	.100	70.0	76.0
15	1.000	.500	.100	.100	70.0	76.0
16	1.000	.700	.200	.200	70.0	76.0
17	1.000	.800	.500	.500	70.0	76.0
18	1.000	.900	1.000	1.000	70.0	76.0
19	1.000	.800	.500	.500	70.0	76.0
20	1.000	.700	.400	.400	70.0	76.0
21	.600	.700	.400	.400	70.0	76.0
22	.100	.500	.000	.000	70.0	76.0
23	.100	.500	.000	.000	70.0	76.0
24	.100	.500	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)				68.000000		
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)				65.000000		
SYSTEM TYPE, (IECN)				2		
SUPPLY AIR CFM (SACFM)				3490.000000		
ECONOMIZER HIGH TEMP LIMIT F				65.000000		
SYSTEM SUPPLY AIR START TIME HR				0.000000E+00		
SYSTEM SUPPLY AIR STOP TIME HR				24.000000		
SYSTEM MIXED AIR TEMP (TMXAIR)				70.000000		
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)				1.000000E-01		
FAN EFFICIENCY (EFAN)				5.500000E-01		
FAN TOTAL PRESSURE IN. WATER (DP)				1.600000		
HEATING PLANT RATED OUTPUT BTU (HFLOT)				78000.000000		
HEATING PLANT RATED INPUT BTU (HFLIN)				97500.000000		
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)				0		
COOLING PLANT RATED OUTPUT BTU (CFLOT)				96225.000000		
COOLING PLANT RATED INPUT BTU (CFLIN)				17789.000000		
COOLING PLANT PART LOAD FRAC VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 1721 - DAYROOM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

MNTH LOAD			SOLAR	ROOF	PARTITN DOOR AND SLAB	BSMT	WALL	WINDOW	VENT AND INFL	LATENT
			THRU WINDOW							
JAN	.00	GAIN	2.72	.00	.00	.00	.00	.00	.00	.00
	-22.05	LOSS		-2.59	-4.59	.00	-4.44	-2.68	-20.36	.00
FEB	.02	GAIN	3.39	.00	.00	.00	.00	.00	.00	.01
	-16.91	LOSS		-2.15	-3.92	.00	-3.36	-2.29	-17.49	.00
MAR	1.06	GAIN	4.40	.01	.00	.00	.10	.00	.00	.12
	-13.19	LOSS		-1.94	-3.66	.00	-2.64	-2.14	-16.26	.00
APR	5.09	GAIN	4.62	.08	.02	.00	.48	.01	.08	.61
	-5.00	LOSS		-1.16	-2.19	.00	-1.23	-1.28	-9.47	.00
MAY	11.22	GAIN	5.07	.20	.07	.00	1.03	.04	.25	2.31
	-1.05	LOSS		-.72	-1.28	.00	-.42	-.72	-5.54	.00
JUN	22.65	GAIN	5.09	.35	.20	.00	1.66	.12	.77	8.46
	-.05	LOSS		-.41	-.62	.00	-.09	-.35	-2.14	.00
JUL	29.27	GAIN	5.28	.53	.52	.00	2.29	.31	1.99	10.76
	.00	LOSS		-.30	-.38	.00	-.04	-.22	-1.35	.00
AUG	27.36	GAIN	4.67	.43	.39	.00	1.89	.22	1.44	10.84
	-.04	LOSS		-.32	-.42	.00	-.05	-.24	-1.42	.00
SEP	16.13	GAIN	3.76	.19	.20	.00	.99	.12	.79	6.17
	-1.34	LOSS		-.64	-1.03	.00	-.43	-.59	-4.32	.00
OCT	4.58	GAIN	3.17	.03	.03	.00	.22	.02	.11	1.11
	-4.60	LOSS		-1.26	-2.12	.00	-1.46	-1.21	-8.55	.00
NOV	1.19	GAIN	2.51	.00	.00	.00	.03	.00	.00	.22
	-10.40	LOSS		-1.75	-3.01	.00	-2.62	-1.72	-12.45	.00
DEC	.06	GAIN	2.46	.00	.00	.00	.00	.00	.00	.00
	-21.36	LOSS		-2.57	-4.50	.00	-4.47	-2.60	-19.51	.00
TOT	119.	GAIN	47.	2.	1.	0.	9.	1.	5.	41.
	-96.	LOSS		-16.	-28.	0.	-21.	-16.	-119.	0.

MAX HEATING LOAD= -77680. BTUH ON DEC 18 HOUR 9 AMBIENT TEMP 3.  
 MAX COOLING LOAD= 88367. BTUH ON JUL 3 HOUR 12 AMBIENT TEMP 86.

ZONE UA BTU/HR-F 430.5

BLDG 1721 - DAYROOM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	77.	68.	4 27	12 6	63. 4.	1.13	4.86	3.03	9.88
FEB	71.	77.	69.	17 2	13 6	59. 14.	1.02	4.39	2.73	8.93
MAR	71.	78.	69.	12 4	13 6	74. 15.	1.13	4.86	3.03	9.88
APR	73.	78.	69.	30 9	12 5	80. 30.	1.09	4.71	2.93	9.57
MAY	75.	78.	69.	28 11	12 5	85. 39.	1.13	4.86	3.03	9.88
JUN	76.	78.	70.	22 17	12 5	84. 56.	1.09	4.71	2.93	9.57
JUL	77.	78.	70.	3 10	12 6	86. 60.	1.13	4.86	3.03	9.88
AUG	77.	78.	70.	19 25	12 6	87. 51.	1.13	4.86	3.03	9.88
SEP	75.	78.	70.	3 15	12 6	89. 39.	1.09	4.71	2.93	9.57
OCT	73.	78.	69.	5 28	12 5	84. 31.	1.13	4.86	3.03	9.88
NOV	72.	77.	69.	8 3	12 6	74. 18.	1.09	4.71	2.93	9.57
DEC	70.	77.	63.	29 18	18 8	57. 1.	1.13	4.86	3.03	9.88
YEAR							13.32	57.27	35.63	116.38

BLDG 1721 - DAYROOM    OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	COOLING INCLUDING ECONOMIZER		NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
	HEATING		HEATING	COOLING	HEATING	COOLING
JAN	675	16	1	0	-.7768E+05	.0000
FEB	555	32	0	0	-.6668E+05	.1891E+05
MAR	516	97	0	0	-.6657E+05	.4323E+05
APR	285	231	0	0	-.4092E+05	.4922E+05
MAY	101	389	0	0	-.2743E+05	.6058E+05
JUN	14	525	0	0	-6653.	.8062E+05
JUL	2	641	0	0	-2120.	.8837E+05
AUG	8	629	0	0	-.1066E+05	.8153E+05
SEP	110	444	0	0	-.2622E+05	.8619E+05
OCT	284	228	0	0	-.3819E+05	.6355E+05
NOV	466	103	0	0	-.5659E+05	.4506E+05
DEC	679	16	12	0	-.7768E+05	.1754E+05
YEAR	3695	3351	13	0	-.7768E+05	.8837E+05



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION				TOTAL INTERNAL HEAT GAIN MILLION BTU	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FANS THOUSAND KWH		
JAN	31.07	.00	1.13	4.86	.89	9.88	3.7
FEB	24.35	.00	1.02	4.39	.80	8.93	5.0
MAR	19.93	.06	1.13	4.86	.89	9.88	5.9
APR	8.68	.28	1.09	4.71	.86	9.57	6.1
MAY	2.38	.59	1.13	4.86	.89	9.88	6.8
JUN	.26	1.18	1.09	4.71	.86	9.57	7.9
JUL	.04	1.53	1.13	4.86	.89	9.88	8.4
AUG	.15	1.43	1.13	4.86	.89	9.88	8.0
SEP	2.71	.85	1.09	4.71	.86	9.57	8.3
OCT	8.19	.26	1.13	4.86	.89	9.88	6.9
NOV	16.37	.08	1.09	4.71	.86	9.57	6.0
DEC	30.48	.00	1.13	4.86	.89	9.88	5.0
YEAR	144.62	6.27	13.32	57.27	10.44	116.38	8.4

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 158539. BTU/(SQFT-YEAR)

BLDG 1721 - DAYROOM OUTSIDE AIR (NIGHTTIME) (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET		MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
	DAY	DAY					COOL	HEAT		
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.7768E+05
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.1891E+05	-.6668E+05
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.4323E+05	-.6657E+05
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.4922E+05	-.4092E+05
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.6058E+05	-.2743E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.8062E+05	-6653.
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8837E+05	-2120.
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.8153E+05	-.1066E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8619E+05	-.2622E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.6355E+05	-.3819E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.4506E+05	-.5659E+05
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1754E+05	-.7768E+05

BLDG 1721 - DAYROOM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## ----- PROGRAM CONTROL OPTIONS -----

COOLING ON WEEKEND (1=YES, 0=NO) (ICWK) 1  
 ROOF HAS VENTED ATTIC (1=YES, 0=NO) (IATIC) 0  
 WEEKEND INTERNAL GAINS FACTOR (WKEND) 1.000000  
 LAST CASE FLAG (1=YES, 0=NO) (LSTCS) 1  
 SKY CLEARNESS FACTOR (CLN) 9.700000E-01  
 NUMBER OF ZONES (NZ) 1  
 WEATHER SOURCE ISW=0 WEATHER ON TAPE6, ISW=1  
 WEATHER AS SPECIFIED IN TAVE, ECT. (ISW) 0

## ----- SITE AND BUILDING DATA -----

\*\*\*\*\*REAL WEATHER FROM DISK\*\*\*\*\*

FILE NAME MO

STATION 13995 YEAR 1955

SITE LATITUDE DEG (AL1) 37.750000

ELEVATION ABOVE SEA LEVEL IN FEET (ELEV) 1158.000000

MEAN AMBIENT TEMP FOR YEAR DEG F (TMAMB) 56.000000

AMPLITUDE OF GROUND TEMP SWING DEG F (AMGRN) 20.000000

SOLAR ABSORBTIVITY OF WALLS (ALPHA) 6.800000E-01

SOLAR ABSORBTIVITY OF ROOF (ALFRF) 3.500000E-01

SOLAR REFLECTANCE OF GROUND (RHOG) 2.000000E-01

INITIAL TEMP OF AIR IN BUILDING DEG F (TAO) 70.000000

INITIAL TEMPERATURE OF BUILDING MASS (TO) 70.000000

INSIDE SUMMER HUMIDITY RATIO LBS/LBS (HRS) 9.000000E-03

INSIDE WINTER HUMIDITY RATIO LBS/LBS (HRW) 0.000000E+00

VOLUME OF ZONE IN CUBIC FEET (VOLHS) 17278.000000

FLOOR AREA (SQFT) 1920.000000

HEATING COIL MAX HEATING RATE BTU/HR (QHMAX) 77680.000000

COOLING COIL MAX COOLING RATE BTU/HR (QCMAX) -96225.000000

COND BETWEEN BLDG AIR AND MASS BTU/HR-F (GA) 19200.000000

CONSTANT INFILTRATION RATE CFM (CFMI) 110.000000

## INFILTRATION PROFILE

1.00	1.00	1.00	1.00	1.00	1.00	1.00	.000
.000	.000	.000	.000	.000	.000	.000	.000
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A FACTOR IN INFILTRATION EQUATION (CINA) 3.820000E-01

B FACTOR IN INFILTRATION EQUATION (CINB) 2.165000E-02

C FACTOR IN INFILTRATION EQUATION (CINC) 8.330000E-03

BUILDING THERMAL MASS MCP BTU/F (CMCP) 4800.000000

BASEMENT UA FACTOR BTU/HR-F (BSNF) 0.000000E+00

SLAB ON GRADE FACTOR BTU/HR-F (SLBF) 157.000000

PARTITION UA BTU/HR-F (GUA) 0.000000E+00

DOOR UA BTU/HR-F (DUA) 16.380000

WINDOW GLASS NUMBER (NG) 30

DAY TIME WINDOW U BTU/HR-SQFT-F (WNDUO) 6.930472E-01

NIGHT TIME WINDOW U BTU/HR-SQFT-F (WNDUN) 6.930472E-01

WINDOW SHADING FACTOR (SHD) 5.900000E-01

## WALL DATA

WALL NUMBER	1	2	3	4
AZIMUTH ANGLE (AZ)	-45.00	45.00	135.00	-135.00
WALL AREA SQFT (AWLL)	313.0	539.0	472.0	556.0
WINDOW AREA SQFT (AWND)	60.0	72.0	60.0	.0
WINDOW HEIGHT FT (WNDH)	10.0	10.0	10.0	10.0
WINDOW WIDTH FT (WNDW)	6.0	7.2	6.0	.0
WIDTH OF OVERHANG (WOH)	6.8	2.0	6.8	.0
OVERHANG HGT ABV WNDW (HOH)	.0	.0	.0	.0

MAX SOLAR WITH NO SHADE(SOLMX)	120.0	120.0	120.0	120.0
U VALUE BTU/(HR-SQFT-F) (UW)	.110	.110	.110	.110
WALL TRANSFER FUNCTIONS				
CN FACTORS	.00471	.00471	.00471	.00471
NUMBER OF BN FACTORS (NB	5	5	5	5
BN FACTORS BN (BN)				
N=1	.00000	.00000	.00000	.00000
N=2	.00050	.00050	.00050	.00050
N=3	.00243	.00243	.00243	.00243
N=4	.00162	.00162	.00162	.00162
N=5	.00017	.00017	.00017	.00017
N=6	*****	*****	*****	*****
NUMBER OF DN FACTORS (ND)	6	6	6	6
DN FACTORS				
N=1	1.00000	1.00000	1.00000	1.00000
N=2	-1.73771	-1.73771	-1.73771	-1.73771
N=3	.90936	.90936	.90936	.90936
N=4	-.13373	-.13373	-.13373	-.13373
N=5	.00496	.00496	.00496	.00496
N=6	-.00001	-.00001	-.00001	-.00001
ROOF AREA SQFT (AROF)	1920.000000			
ROOF U VALUE BTU/HR-SQFT-F (URF)	4.600000E-02			
ROOF TRANS FUNCTIONS USED (1=YES, 0=NO) (IROOF)			1	
ROOF C TRANSFER FUNCTION (CNR)	8.756841E-03			
ROOF B TRANSFER FUNCTIONS (BNR)				
.886E-05 .130E-02 .487E-02 .240E-02 .177E-03	885.			
ROOF D TRANSFER FUNCTIONS (DNR)				
1.00 -1.18 .410 -.444E-01 .500E-03	999.			
SKYLIGHT TILT DEGREES (TILT)	0.000000E+00			
SKYLIGHT AZIMUTH ANGLE DEGREES (AZSK)	9999.000000			
SKYLIGHT HEIGHT FT (SKH)	0.000000E+00			
SKYLIGHT WIDTH FT (SKW)	0.000000E+00			
SKYLIGHT OVERHANG WIDTH FT (SKOW)	0.000000E+00			
OVERHANG HEIGHT ABOVE SKYLIGHT FT (SKOH)	0.000000E+00			
SKYLIGHT GLASS NUMBER (NS)	1			
SKYLIGHT SHADING COEFFICIENT (SHSK)	0.000000E+00			
SUMMER START MONTH AND DAY FOR SHSK (MST,NDST)			1	1
SUMMER END MONTH AND DAY FOR SHSK (MND,END)			1	1
SKY LIGHT AREA SQFT (ASKY)	0.000000E+00			
DAYTIME SKY LIGHT U BTU/SQFT-HR-F (SKYU)	1.292998			
NIGHT TIME SKYLIGHT U BTU/SQFT-HR-F (SKYUN)	1.292998			
FRACTION OF PROCESS HEAT TO INTERNAL SPACE (FAP)	4.200000E-01			

-----INTERNAL GAINS AND PROFILES -----

THERMOSTAT SET  
POINT DEG F

PEAK VAL	HOUR	LIGHTS	PROCESS	SENSIBLE	LATENT	HEATING	COOLING
		3.	4452.	5400.	4400.		
		HOURLY FRACTION OF PEAK					
1	.100	.500	.000	.000	.000	70.0	76.0
2	.100	.500	.000	.000	.000	70.0	76.0
3	.100	.500	.000	.000	.000	70.0	76.0
4	.100	.500	.000	.000	.000	70.0	76.0
5	.100	.500	.000	.000	.000	70.0	76.0
6	.100	.500	.000	.000	.000	70.0	76.0
7	.600	.500	.100	.100	.100	70.0	76.0
8	.600	.500	.100	.100	.100	70.0	76.0
9	.600	.500	.100	.100	.100	70.0	76.0
10	1.000	.700	.200	.200	.200	70.0	76.0
11	1.000	.800	.500	.500	.500	70.0	76.0
12	1.000	.900	1.000	1.000	1.000	70.0	76.0

13	1.000	.800	.500	.500	70.0	76.0
14	1.000	.500	.100	.100	70.0	76.0
15	1.000	.500	.100	.100	70.0	76.0
16	1.000	.700	.200	.200	70.0	76.0
17	1.000	.800	.500	.500	70.0	76.0
18	1.000	.900	1.000	1.000	70.0	76.0
19	1.000	.800	.500	.500	70.0	76.0
20	1.000	.700	.400	.400	70.0	76.0
21	.600	.700	.400	.400	70.0	76.0
22	.100	.500	.000	.000	70.0	76.0
23	.100	.500	.000	.000	70.0	76.0
24	.100	.500	.000	.000	70.0	76.0
NO HEATING ABOVE AMBIENT TEMP. OF (THLKOT)					68.000000	
NO COOLING BELOW AMBIENT TEMP. OF (TCLKOT)					65.000000	
SYSTEM TYPE, (IECN)					2	
SUPPLY AIR CFM (SACFM)					3490.000000	
ECONOMIZER HIGH TEMP LIMIT F					65.000000	
SYSTEM SUPPLY AIR START TIME HR					0.000000E+00	
SYSTEM SUPPLY AIR STOP TIME HR					24.000000	
SYSTEM MIXED AIR TEMP(TMXAIR)					70.000000	
MIN OUTSIDE AIR FRACTION OF SACFM (OAFR)					1.000000E-01	
FAN EFFICIENCY (EFAN)					5.500000E-01	
FAN TOTAL PRESSURE IN. WATER (DP)					1.600000	
HEATING PLANT RATED OUTPUT BTU (HFLOT)					78000.000000	
HEATING PLANT RATED INPUT BTU (HFLIN)					97500.000000	
HEATING PLANT PART LOAD VS FRAC OF INPUT TABLE (PLH)						
.100	.191	.200	.286	.300	.369	.400 .451
.500	.537	.600	.625	.700	.718	.800 .812
.900	.906	1.00	1.00			
CHILLER TYPE (ITYPCH)					0	
COOLING PLANT RATED OUTPUT BTU (CFLOT)					96225.000000	
COOLING PLANT RATED INPUT BTU (CFLIN)					17789.000000	
COOLING PLANT PART LOAD VS FRAC RATED COP (PLC)						
.100	.200	.200	.250	.300	.310	.400 .370
.500	.450	.600	.550	.700	.650	.800 .760
.900	.880	1.00	1.00			

BLDG 1721 - DAYROOM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## ENERGY GAIN/LOSS SUMMARY IN MILLION BTU

			SOLAR	PARTITN				VENT		
MONTH	LOAD		THRU	DOOR	AND	BSMT	WALL	WINDOW	INFL	LATENT
			WINDOW	ROOF	SLAB					
JAN	.00	GAIN	2.72	.00	.00	.00	.00	.00	.00	.00
	-23.05	LOSS		-2.59	-4.59	.00	-4.44	-2.67	-21.38	.00
FEB	.02	GAIN	3.39	.00	.00	.00	.00	.00	.00	.00
	-17.84	LOSS		-2.15	-3.93	.00	-3.37	-2.30	-18.40	.00
MAR	1.07	GAIN	4.40	.01	.00	.00	.10	.00	.00	.12
	-14.14	LOSS		-1.95	-3.67	.00	-2.65	-2.14	-17.18	.00
APR	5.07	GAIN	4.62	.08	.02	.00	.49	.01	.07	.59
	-5.69	LOSS		-1.17	-2.19	.00	-1.24	-1.28	-10.14	.00
MAY	11.05	GAIN	5.07	.20	.07	.00	1.04	.04	.22	2.20
	-1.36	LOSS		-.71	-1.26	.00	-.40	-.71	-5.95	.00
JUN	22.02	GAIN	5.09	.35	.20	.00	1.67	.12	.69	8.07
	-.09	LOSS		-.41	-.60	.00	-.08	-.34	-2.40	.00
JUL	29.12	GAIN	5.28	.53	.52	.00	2.29	.31	1.85	10.87
	-.01	LOSS		-.29	-.37	.00	-.04	-.21	-1.51	.00
AUG	27.08	GAIN	4.67	.43	.39	.00	1.90	.22	1.33	10.84
	-.07	LOSS		-.32	-.42	.00	-.05	-.23	-1.63	.00
SEP	15.74	GAIN	3.76	.19	.20	.00	.99	.12	.71	5.94
	-1.63	LOSS		-.64	-1.02	.00	-.42	-.59	-4.72	.00
OCT	4.50	GAIN	3.17	.03	.03	.00	.22	.02	.09	1.04
	-5.24	LOSS		-1.26	-2.11	.00	-1.46	-1.20	-9.20	.00
NOV	1.19	GAIN	2.51	.00	.00	.00	.03	.00	.00	.21
	-11.22	LOSS		-1.75	-3.01	.00	-2.62	-1.72	-13.24	.00
DEC	.06	GAIN	2.46	.00	.00	.00	.00	.00	.00	.00
	-22.36	LOSS		-2.57	-4.50	.00	-4.46	-2.59	-20.52	.00
TOT	117.	GAIN	47.	2.	1.	0.	9.	1.	5.	40.
	-103.	LOSS		-16.	-28.	0.	-21.	-16.	-126.	0.

MAX HEATING LOAD= -77680. BTUH ON DEC 18 HOUR 9 AMBIENT TEMP 3.  
 MAX COOLING LOAD= 87377. BTUH ON JUL 28 HOUR 17 AMBIENT TEMP 92.

ZONE UA BTU/HR-F 430.5

BLDG 1721 - DAYROOM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

INTERNAL MONTH	INTERNAL SPACE TEMPERATURE F			DAY	HR	COIN- CIDENT AMBT.	LIGHTING THOUSAND KWH	PROCESS MILLION BTU	FAN	TOTAL
	AVG.	MAX	MIN						HEAT MILLION BTU	HEAT GAIN MILLION BTU
JAN	70.	77.	64.	2 27	13 6	57. 4.	1.13	4.86	3.03	9.88
FEB	71.	77.	69.	17 2	13 6	59. 14.	1.02	4.39	2.73	8.93
MAR	71.	78.	69.	12 4	13 6	74. 15.	1.13	4.86	3.03	9.88
APR	73.	78.	69.	30 9	12 5	80. 30.	1.09	4.71	2.93	9.57
MAY	75.	78.	69.	28 11	12 5	85. 39.	1.13	4.86	3.03	9.88
JUN	76.	78.	70.	22 17	12 5	84. 56.	1.09	4.71	2.93	9.57
JUL	77.	78.	70.	3 10	12 5	86. 57.	1.13	4.86	3.03	9.88
AUG	77.	78.	70.	19 25	12 6	87. 51.	1.13	4.86	3.03	9.88
SEP	75.	78.	69.	3 15	12 6	89. 39.	1.09	4.71	2.93	9.57
OCT	73.	78.	69.	5 28	12 5	84. 31.	1.13	4.86	3.03	9.88
NOV	72.	77.	69.	8 3	12 6	74. 18.	1.09	4.71	2.93	9.57
DEC	70.	77.	58.	16 18	15 6	56. 0.	1.13	4.86	3.03	9.88
YEAR							13.32	57.27	35.63	116.38

BLDG 1721 - DAYROOM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

NUMBER OF HOURS WHEN  
HEATING OR COOLING  
IS REQUIRED

MONTH	HEATING	COOLING INCLUDING ECONOMIZER	NUMBER OF HOURS WHEN LOADS WERE NOT MET		MAXIMUM LOADS BTU	
			HEATING	COOLING	HEATING	COOLING
JAN	674	17	14	0	-.7768E+05	.0000
FEB	545	35	0	0	-.7356E+05	.1910E+05
MAR	510	102	0	0	-.7331E+05	.4299E+05
APR	290	230	0	0	-.4580E+05	.4819E+05
MAY	120	382	0	0	-.3121E+05	.5847E+05
JUN	18	503	0	0	-8319.	.7878E+05
JUL	3	622	0	0	-5739.	.8738E+05
AUG	11	606	0	0	-.1281E+05	.7778E+05
SEP	118	427	0	0	-.2989E+05	.8073E+05
OCT	297	228	0	0	-.4306E+05	.6052E+05
NOV	460	101	0	0	-.6320E+05	.4413E+05
DEC	668	15	12	0	-.7768E+05	.1924E+05
YEAR	3714	3268	26	0	-.7768E+05	.8738E+05



## SYSTEM TOTALS

MONTH	HEATING MILLION BTU	ENERGY CONSUMPTION			FANS THOUSAND KWH	TOTAL INTERNAL	MAXIMUM ELECTRIC DEMAND KW
		COOLING THOUSAND KWH	LIGHTING THOUSAND KWH	PROCESS MILLION BTU		HEAT GAIN MILLION BTU	
JAN	32.25	.00	1.13	4.86	.89	9.88	3.7
FEB	25.26	.00	1.02	4.39	.80	8.93	5.0
MAR	20.88	.06	1.13	4.86	.89	9.88	5.9
APR	9.44	.28	1.09	4.71	.86	9.57	6.1
MAY	2.93	.58	1.13	4.86	.89	9.88	6.7
JUN	.33	1.13	1.09	4.71	.86	9.57	7.8
JUL	.06	1.50	1.13	4.86	.89	9.88	8.4
AUG	.22	1.39	1.13	4.86	.89	9.88	7.8
SEP	3.11	.82	1.09	4.71	.86	9.57	7.9
OCT	9.04	.26	1.13	4.86	.89	9.88	6.8
NOV	17.15	.08	1.09	4.71	.86	9.57	5.9
DEC	31.51	.00	1.13	4.86	.89	9.88	5.0
YEAR	152.17	6.12	13.32	57.27	10.44	116.38	8.4

ENERGY CONSUMPTION PER SQUARE FOOT OF FLOOR 162202. BTU/(SQFT-YEAR)

BLDG 1721 - DAYROOM OUTSIDE AIR (DAYTIME) (FT LEONARD WOOD, MO)

## OTHER MONTHLY STATISTICS

MONTH	CLEAR DAY SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	ACTUAL SOLAR INSOL. HORIZ. SURF. BTU/ SQFT-	PF FACTOR	AVG. AMBT. DEG. F	MAX TEMP. DEG. F	SYSTEM DRIFT DEG. F	HOURS WHEN SYSTEM LOADS NOT MET COOL	HEAT	MAXIMUM COOLING LOAD BTU	MAXIMUM HEATING LOAD BTU
JAN	1010.	655.	1.000	35.	0.	0.	0	0	.0000	-.7768E+05
FEB	1421.	901.	1.000	37.	0.	0.	0	0	.1910E+05	-.7356E+05
MAR	1864.	1216.	1.000	43.	0.	0.	0	0	.4299E+05	-.7331E+05
APR	2242.	1552.	1.000	55.	0.	0.	0	0	.4819E+05	-.4580E+05
MAY	2489.	1771.	1.000	65.	0.	0.	0	0	.5847E+05	-.3121E+05
JUN	2567.	1933.	1.000	72.	0.	0.	0	0	.7878E+05	-8319.
JUL	2470.	1954.	1.000	77.	0.	0.	0	0	.8738E+05	-5739.
AUG	2211.	1784.	1.000	76.	0.	0.	0	0	.7778E+05	-.1281E+05
SEP	1800.	1330.	1.000	68.	0.	0.	0	0	.8073E+05	-.2989E+05
OCT	1394.	924.	1.000	57.	0.	0.	0	0	.6052E+05	-.4306E+05
NOV	1008.	710.	1.000	47.	0.	0.	0	0	.4413E+05	-.6320E+05
DEC	856.	586.	1.000	35.	0.	0.	0	0	.1924E+05	-.7768E+05

**COMPUTER SIMULATIONS**

BUILDING 2100

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 18-Mar-93  
BUILDING NO.: 2100  
BLDG. TYPE: RECEPTION CENTER

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	614.7	493.3	278.4	278.4	228.1	382.7
COOLING (kWH)	185529	169028	151021	147506	183308	175188

SUPPLY AIR FAN	68464 CFM
FLOOR AREA	74789 FT <sup>2</sup>
CFMI	3831 CFM
UA	11901 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY				ANNUAL HEATING & COOLING HOURS	
M-F	700	1700	50 HR	HR. ON HEATING	1300 HR/YR
SAT.			0 HR	HR. ON COOLING	871 HR/YR
SUN.			0 HR	HR. OFF HEATING	3068 HR/YR
	TOTAL OCCUPY HR.		50 HR/WK	HR. OFF COOLING	2057 HR/YR
	TOTAL UNOCC. HR.		118 HR/WK		
	ANNUAL OCCUPY HR.		2607 HR/YR		
	ANNUAL UNOCC. HR.		6153 HR/YR		

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 1300 = 3068 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 871 = 2057 HR/YR

HOAUHC	614.7 MBtu -	228.1 MBtu	=	1.64E+01 Btu/CFM-HR
	3831 CFM *	6153 HR/YR		
HOAUH	614.7 MBtu -	228.1 MBtu	=	3.29E+01 Btu/CFM-HR
	3831 CFM *	3068 HR/YR		
COAUHC	185529 kWH -	183308 kWH	=	9.42E-05 kWH/CFM-HR
	3831 CFM *	6153 HR/YR		
COAUC	185529 kWH -	183308 kWH	=	2.82E-04 kWH/CFM-HR
	3831 CFM *	2057 HR/YR		
HOAOHC	614.7 MBtu -	382.7 MBtu	=	2.32E+01 Btu/CFM-HR
	3831 CFM *	2607 HR/YR		
HOAOH	614.7 MBtu -	382.7 MBtu	=	4.66E+01 Btu/CFM-HR
	3831 CFM *	1300 HR/YR		
COAOHC	185529 kWH -	175188 kWH	=	1.04E-03 kWH/CFM-HR
	3831 CFM *	2607 HR/YR		
COAOC	185529 kWH -	175188 kWH	=	3.10E-03 kWH/CFM-HR
	3831 CFM *	871 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)				= 0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)				= 0.17

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 18-Mar-93  
BUILDING NO.: 2100  
BLDG. TYPE: RECEPTION CENTER

**ENERGY CONSTANT CALCULATIONS**

ECC	151021 KWH -	147506 KWH	=	5.89E-05 KWH/CFM-HR
	68464 CFM *	871 HR/YR		
ECHC	151021 KWH -	147506 KWH	=	1.97E-05 KWH/CFM-HR
	68464 CFM *	2607 HR/YR		
NSUCHC	185529 KWH -	169028 KWH	=	3.92E-05 KWH/CFM-HR
	68464 CFM *	6153 HR/YR		
NSUCC	185529 KWH -	169028 KWH	=	1.17E-04 KWH/CFM-HR
	68464 CFM *	2057 HR/YR		
DDCCHC	169028 KWH -	151021 KWH	=	1.01E-04 KWH/CFM-HR
	68464 CFM *	2607 HR/YR		
DDCCC	169028 KWH -	151021 KWH	=	3.02E-04 KWH/CFM-HR
	68464 CFM *	871 HR/YR		
NSC	614.7 MBtu -	493.3 MBtu	=	1.02E+04 Btu/UA
	11901 UA			
DSC	493.3 MBtu -	278.4 MBtu	=	1.81E+04 Btu/UA
	11901 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 2100BLZ1

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 2100 BLDG NAME: RECEPTION CENTER

BLDG FUNCTION: ADMINISTRATION OFFICES - ZONE 1

FLOOR AREA: (SQ. FT) 18,716

# FLOORS 1

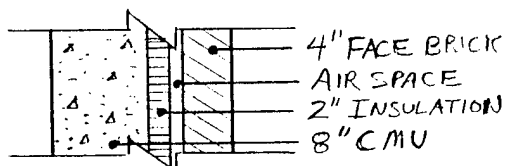
SLAB PERIMETER: (FT) 627

## I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	2,716	1,862	1,120	2,464	8,162
GLASS	(SQ. FT)	203	182	0	240	625
PERSONNEL DOOR	(SQ. FT)	21	0	42	63	126
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	2,492	1,680	1,078	2,161	7,411
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					18,716
INSULATED PANEL	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)		126
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

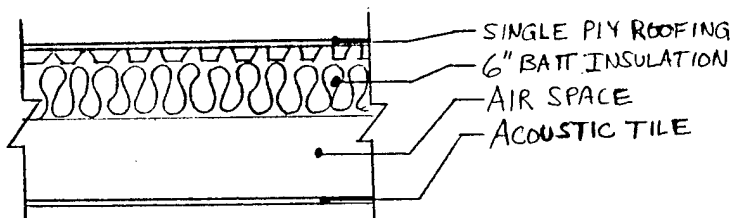
## II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.97
U=1/R	0.029

GLASS TYPE: DOUBLE PANE

SLAB TYPE FLOOR: CONCRETE

BASEMENT TYPE: NONE

INSULATED PANEL: NONE

PERSONNEL DOOR TYPE: METAL

R-GLASS	1.61
SLF	0.83
R-BASEM.	0.00
R-PANEL	4.20
R-PDOOR	2.56

## III. INFILTRATION:

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	8162	X CFM / SQ.FT.	0.115	= 939
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	15	X CFM / OPENING / HR	1.600	=	24
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING / HR	1.385	=	0
TOTAL INFILTRATION (CFM)				=	963

UA PANEL	= PANEL AREA	0	X PANEL "U"	0.238	=	0
UA PDOOR	= PDOOR AREA	126	X DOOR "U"	0.391	=	49
UA WALL	= WALL AREA	7,411	X WALL "U"	0.092	=	680
UA ROOF	= ROOF AREA	18,716	X ROOF "U"	0.029	=	551
UA GLASS	= GLASS AREA	625	X GLASS "U"	0.621	=	388
UA SLAB	= SLAB PERIM.	627	X SLF	0.830	=	520
UA BASEM.	= B-WALL AREA	0	X BASE. "U"	0.000	=	0
INFILTRATION	= CFM	963	X A. T. F.	1.035	=	996

TOTAL UA (BTU/HR°F) 3,185

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG.: DOUG CAGE  
 LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93  
 BY: TMB  
 JOB: 3204.000  
 CHK: AJN  
 FILE: 2100BLZ2

**BUILDING HEATING LOAD CALCULATION SHEET**

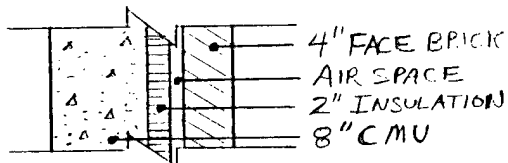
BLDG NO: 2100 BLDG NAME: RECEPTION CENTER  
 BLDG FUNCTION: COMPUTER ROOM - ZONE 2  
 FLOOR AREA: (SQ. FT) 861 # FLOORS 1  
 SLAB PERIMETER: (FT) 62

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	574	0	294	868
GLASS	(SQ. FT)	0	93	0	27	120
PERSONNEL DOOR	(SQ. FT)	0	0	0	0	0
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	481	0	267	748
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					861
INSULATED PANEL	(SQ. FT)	0	PERSONNEL DOOR		(SQ. FT)	0
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

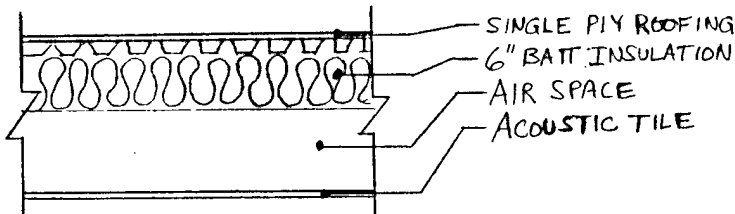
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.97
U=1/R	0.029

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:	NONE	R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	L	868	X CFM / SQ.FT.	0.092	= 80
LEAKY WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR		X CFM / OPENING / HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING / HR	1.385	=	0
		TOTAL INFILTRATION (CFM)		=	80

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	0	X DOOR 'U'	0.391	=	0
UA WALL	= WALL AREA	748	X WALL 'U'	0.092	=	69
UA ROOF	= ROOF AREA	861	X ROOF 'U'	0.029	=	25
UA GLASS	= GLASS AREA	120	X GLASS 'U'	0.621	=	75
UA SLAB	= SLAB PERIM.	62	X SLF	0.830	=	51
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	80	X A. T. F.	1.035	=	83

TOTAL UA (BTU/HR°F) 303

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 2100BLZ3

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 2100 BLDG NAME: RECEPTION CENTER

BLDG FUNCTION: ASSEMBLY HALL - ZONE 3

FLOOR AREA: (SQ. FT) 7,667

# FLOORS 1

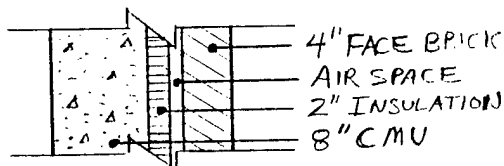
SLAB PERIMETER: (FT) 16

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,157	1,381	486	486	3,510
GLASS	(SQ. FT)	171	344	85	128	728
PERSONNEL DOOR	(SQ. FT)	0	16	0	0	16
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	986	1,021	401	358	2,766
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					8,081
INSULATED PANEL	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)		16
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

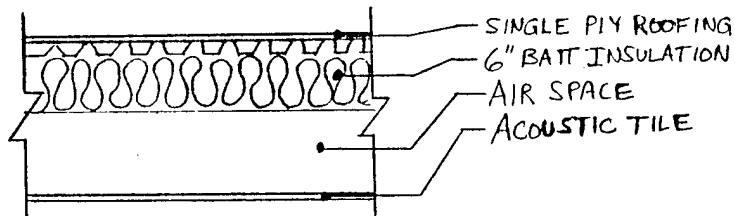
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. ROOF SHINGLES/FELT	0.28
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.92
U=1/R	0.029

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:	NONE	R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	3510	X CFM / SQ.FT.	0.115	= 404
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING /HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	30		X CFM / OPENING /HR	1.385	= 42
TOTAL INFILTRATION (CFM)				=	445

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	16	X DOOR 'U'	0.391	=	6
UA WALL	= WALL AREA	2,766	X WALL 'U'	0.092	=	254
UA ROOF	= ROOF AREA	8,081	X ROOF 'U'	0.029	=	238
UA GLASS	= GLASS AREA	728	X GLASS 'U'	0.621	=	452
UA SLAB	= SLAB PERIM.	16	X SLF	0.830	=	13
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	445	X A. T. F.	1.035	=	461
TOTAL UA (BTU/HR°F)						1,425



**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 2100BLZ4

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 2100 BLDG NAME: RECEPTION CENTER

BLDG FUNCTION: MEDICAL CLINIC - ZONE 4

FLOOR AREA: (SQ. FT) 14,142

# FLOORS 1

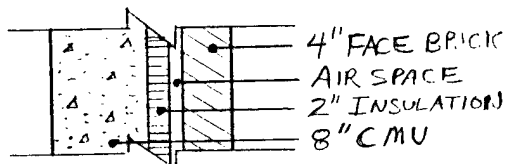
SLAB PERIMETER: (FT) 219

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	108	3,698	990	910	5,706
GLASS	(SQ. FT)	0	494	128	128	750
PERSONNEL DOOR	(SQ. FT)	0	21	0	0	21
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	108	3,183	862	782	4,935
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					14,187
INSULATED PANEL	(SQ. FT)	0				21
PERSONNEL DOOR	(SQ. FT)					0
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

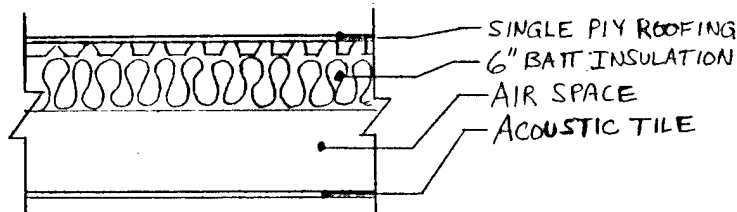
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.97
U=1/R	0.029

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
INSULATED PANEL:	NONE	R-PANEL	4.20
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	5706	X CFM / SQ.FT.	0.115	= 656
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	5	X CFM / OPENING / HR	1.600	=	8
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING / HR	1.385	=	0
TOTAL INFILTRATION (CFM)				=	664

UA PANEL	= PANEL AREA	0	X PANEL "U"	0.238	=	0
UA PDOOR	= PDOOR AREA	21	X DOOR "U"	0.391	=	8
UA WALL	= WALL AREA	4,935	X WALL "U"	0.092	=	453
UA ROOF	= ROOF AREA	14,187	X ROOF "U"	0.029	=	418
UA GLASS	= GLASS AREA	750	X GLASS "U"	0.621	=	466
UA SLAB	= SLAB PERIM.	219	X SLF	0.830	=	182
UA BASEM.	= B-WALL AREA	0	X BASE "U"	0.000	=	0
INFILTRATION	= CFM	664	X A. T. F.	1.035	=	687
TOTAL UA (BTU/HR°F)						2,214

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 2100BLZ5

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 2100 BLDG NAME: RECEPTION CENTER

BLDG FUNCTION: CLOTHING ISSUE - ZONE 5

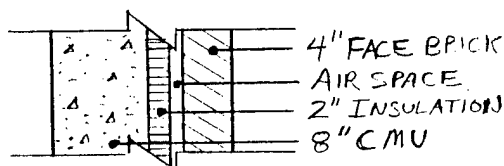
FLOOR AREA: (SQ. FT) 12,680

# FLOORS 1

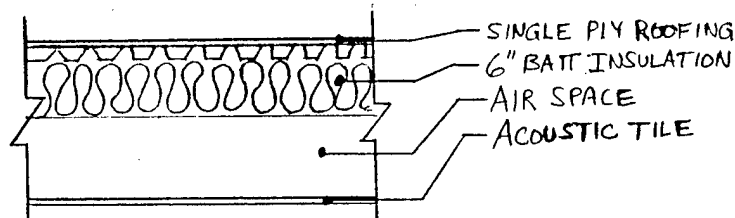
SLAB PERIMETER: (FT) 199

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	3,045	0	969	1,428	5,442
GLASS	(SQ. FT)	0	0	0	0	0
PERSONNEL DOOR	(SQ. FT)	21	0	0	0	21
OVERHEAD DOOR	(SQ. FT)	144	0	0	0	144
WALLS, NET	(SQ. FT)	2,880	0	969	1,428	5,277
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					12,680
OVERHEAD DOOR	(SQ. FT)	144				21
PERSONNEL DOOR	(SQ. FT)					21
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.97
U=1/R	0.029

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	5442	X CFM / SQ.FT.	0.115	= 626
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	5	X CFM / OPENING /HR	1.600	=	8
DOOR OPENINGS / HR - DOUBLE DOORS	20	X CFM / OPENING /HR	1.385	=	28
		TOTAL INFILTRATION (CFM)		=	662

UA ODOOR	= ODOOR AREA	144	X DOOR 'U'	0.952	=	137
UA PDOOR	= PDOOR AREA	21	X DOOR 'U'	0.391	=	8
UA WALL	= WALL AREA	5,133	X WALL 'U'	0.092	=	484
UA ROOF	= ROOF AREA	12,680	X ROOF 'U'	0.029	=	373
UA GLASS	= GLASS AREA	0	X GLASS 'U'	0.621	=	0
UA SLAB	= SLAB PERIM.	199	X SLF	0.830	=	165
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	662	X A. T. F.	1.035	=	685
			TOTAL UA (BTU/HR°F)			1,853

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 2100BLZ6

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 2100 BLDG NAME: RECEPTION CENTER

BLDG FUNCTION: OFFICES AND RETAIL STORE - ZONE 6

FLOOR AREA: (SQ. FT) 13,222

# FLOORS 1

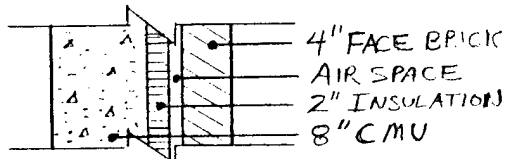
SLAB PERIMETER: (FT) 132

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,498	0	728	0	2,226
GLASS	(SQ. FT)	53	0	0	0	53
PERSONNEL DOOR	(SQ. FT)	42	0	42	0	84
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	1,403	0	686	0	2,089
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					9,887
OVERHEAD DOOR	(SQ. FT)	0				84
PERSONNEL DOOR	(SQ. FT)					84
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

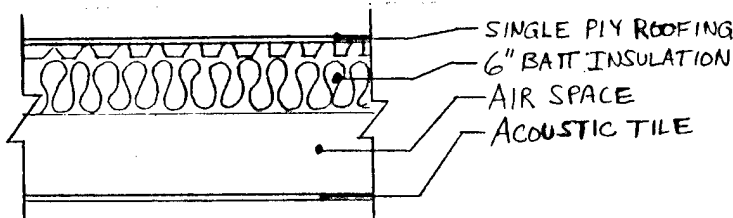
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.97
U=1/R	0.029

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR	NONE	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	2226	X CFM / SQ.FT.	0.115	= 256
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	6	X CFM / OPENING / HR	1.600	=	10
DOOR OPENINGS / HR - DOUBLE DOORS	8	X CFM / OPENING / HR	1.385	=	11
TOTAL INFILTRATION (CFM)					277

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.952	=	0
UA PDOOR	= PDOOR AREA	84	X DOOR 'U'	0.391	=	33
UA WALL	= WALL AREA	2,089	X WALL 'U'	0.092	=	192
UA ROOF	= ROOF AREA	9,887	X ROOF 'U'	0.029	=	291
UA GLASS	= GLASS AREA	53	X GLASS 'U'	0.621	=	33
UA SLAB	= SLAB PERIM.	132	X SLF	0.830	=	110
UA BASEM.	= B-WALL AREA	0	X BASE 'U'	0.000	=	0
INFILTRATION	= CFM	277	X A. T. F.	1.035	=	286
TOTAL UA (BTU/HR°F)						944

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 2100BLZ7

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 2100 BLDG NAME: RECEPTION CENTER

BLDG FUNCTION: CHAPEL / AUDITORIUM - ZONE 7

FLOOR AREA: (SQ. FT) 7,501

# FLOORS 1

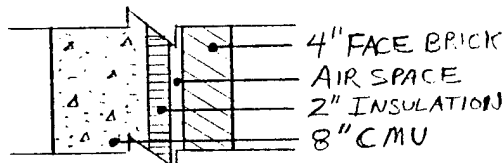
SLAB PERIMETER: (FT) 232

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,566	1,632	1,428	1,596	6,222
GLASS	(SQ. FT)	349	0	0	0	349
PERSONNEL DOOR	(SQ. FT)	52	0	21	21	94
INSULATED PANEL	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	1,165	1,632	1,407	1,575	5,779
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 7,963
INSULATED PANEL	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)		94
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

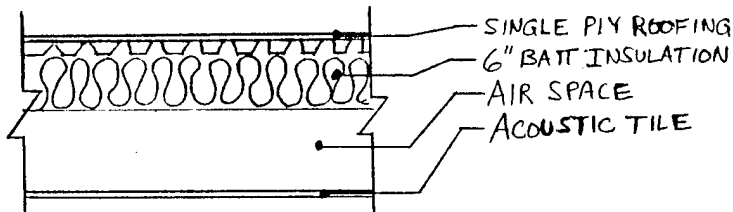
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" L.W. CONC. BLOCK	2.02
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	10.89
U=1/R	0.092

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. SHEET ROOFING	0.34
3. BATT INSULATION	30.00
4. AIR SPACE	1.00
5. ACOUSTIC TILE	1.79
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	33.97
U=1/R	0.029

GLASS TYPE: DOUBLE PANE

R-GLASS 1.61

SLAB TYPE FLOOR: CONCRETE

SLF 0.83

BASEMENT TYPE: NONE

R-BASEM. 0.00

INSULATED PANEL: NONE

R-PANEL 4.20

PERSONNEL DOOR TYPE: METAL

R-PDOOR 2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	6222	X CFM / SQ.FT.	0.115	= 716
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING /HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	18		X CFM / OPENING /HR	1.385	= 25
TOTAL INFILTRATION (CFM)				=	740

UA PANEL	= PANEL AREA	0	X PANEL 'U'	0.238	=	0
UA PDOOR	= PDOOR AREA	94	X DOOR 'U'	0.391	=	37
UA WALL	= WALL AREA	5,779	X WALL 'U'	0.092	=	531
UA ROOF	= ROOF AREA	7,963	X ROOF 'U'	0.029	=	234
UA GLASS	= GLASS AREA	349	X GLASS 'U'	0.621	=	217
UA SLAB	= SLAB PERIM.	232	X SLF	0.830	=	193
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	740	X A. T. F.	1.035	=	766

TOTAL UA (BTU/HR°F) 1,977

## EMC NO.: 3204-000

DATE: 23-Feb-93  
PREPARED BY: TMB  
CHECKED BY: CEL  
FILE: 2100Z1  
BLDG: 2100

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. La (BTU/H)
1	112	4	Seated, light work, typing	Offices, hotels, apts	250	200	28,000	22,400
TOTAL	112					TOTAL	28,000	22,400

Peak Wattage Value for Lights
-------------------------------

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	187	7	Fluorescent, 3 - 34w lamps, 16w ballast (2x4 ft. fixture)	118	22,066
	16	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	1,344
	17	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	850
	3	20	Incandescent - 100w	100	300
TOTAL	223			TOTAL	24,560

### Peak Value for Internal Gains

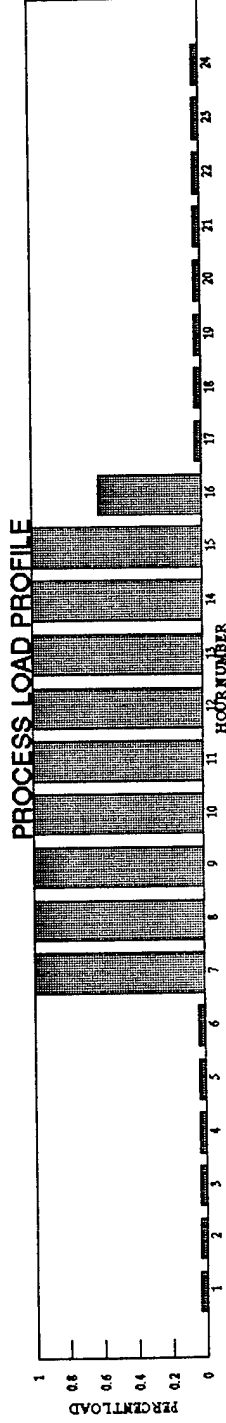
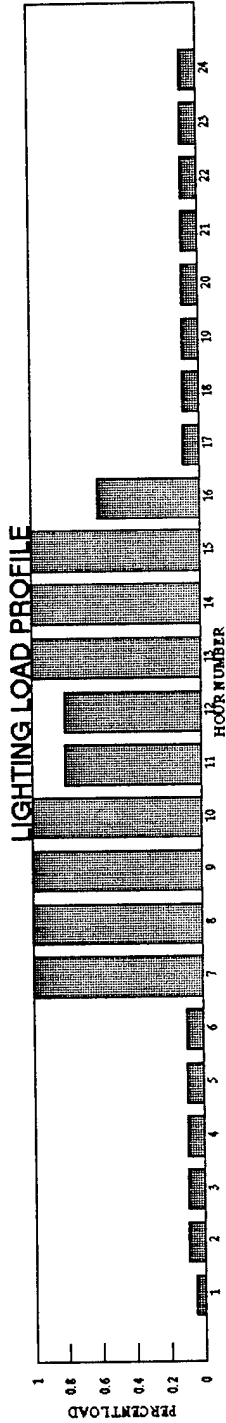
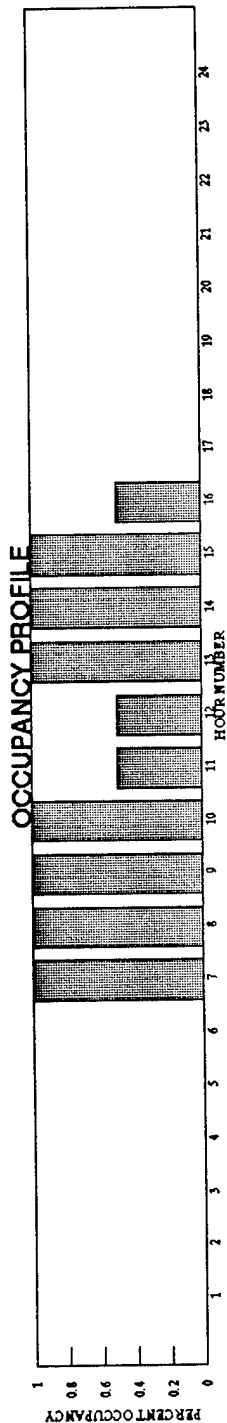
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# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 23-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 2100Z1  
 BLDG: 2100  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.5	1	1	1	1	0.5								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.8	1	1	1	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.0	0.04	0.04	0.04	0.04	0.04	1	1	1	1	1	1	1	1	1	0.6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04



## 3204-000

23-Feb-93

TMB

CEL

210072

2

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
2	6	4	Seated, light work, typing	Offices, hotels, apts	250	200	1,500	1,200
TOTAL	6					TOTAL	1,500	1,200

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
2	14	7	Fluorescent, 3 - 34w lamps, 16w ballast (2x4 ft. fixture)	118	1,652
TOTAL	14			TOTAL	1,652

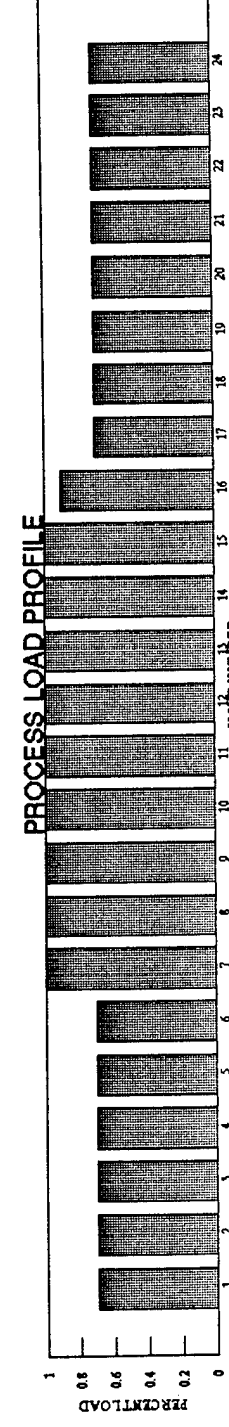
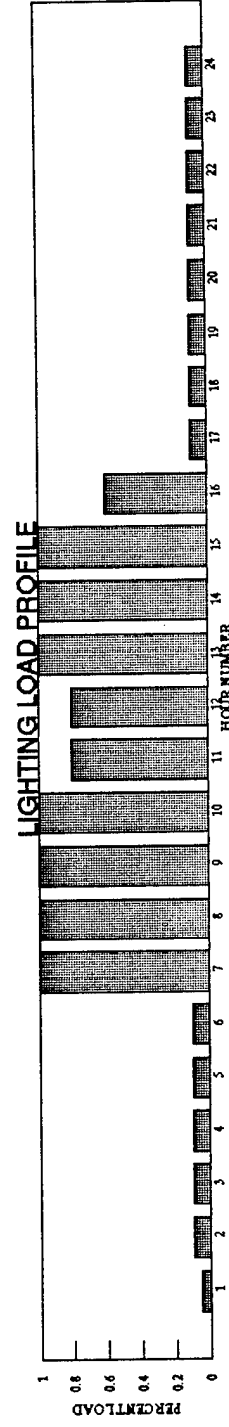
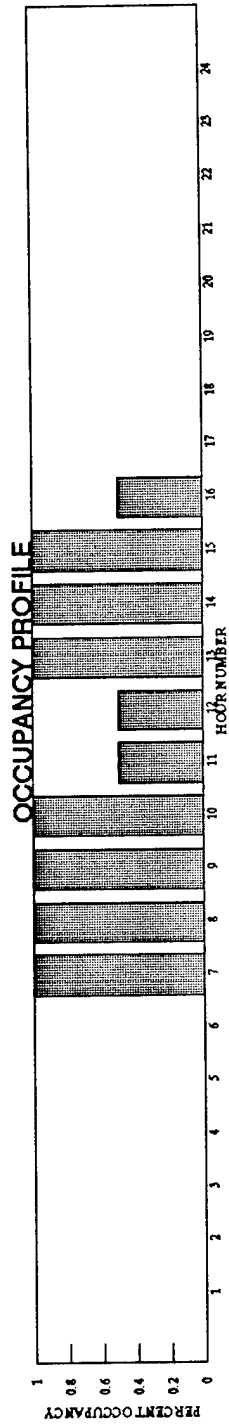
## Peak Value for Internal Gains

[illegible]

EMC NO.: 3204 -000  
 DATE: 23 -Feb--93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 2100Z  
 BLDG: 2100  
 ZONE: 2

**E M C Engineers, Inc.**  
 PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	0.5	0.5	1	1	1	0.5								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	0.8	0.8	1	1	1	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7





EMC NO.: 3204 -- 000

DATE: 23-Feb-93

PREPARED BY: TMB

**CHECKED BY:** CEL

**FILE: 210073**

BLDG: 2100

# Rates of Heat Gain from Occupants of Conditioned Spaces

Rates of Heat Gain from Occupants of Conditioned Spaces								
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
3	75	2	Seated very light work (writing)	Offices, hotels, apts	245	155	18,375	11,625
TOTAL	75					TOTAL	18,375	11,625

### Peak Wattage Value for Lights

<b>Peak Wattage Value for Lights</b>					
<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
3	32	21	Incandescent - 150w	150	4 800
	60	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	3 000
TOTAL	92			TOTAL	7 800

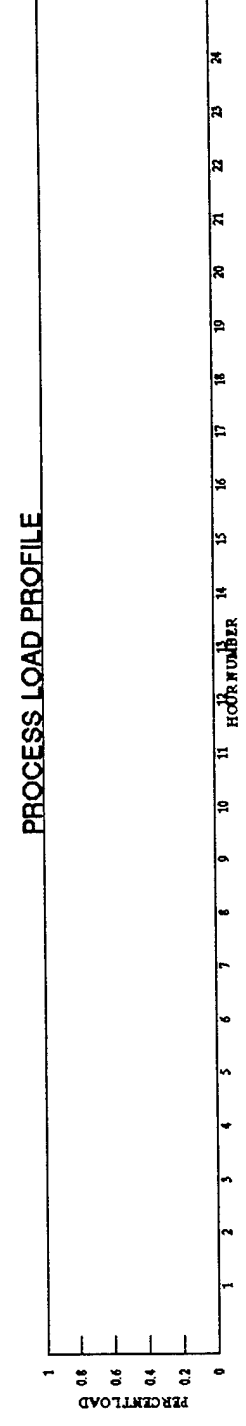
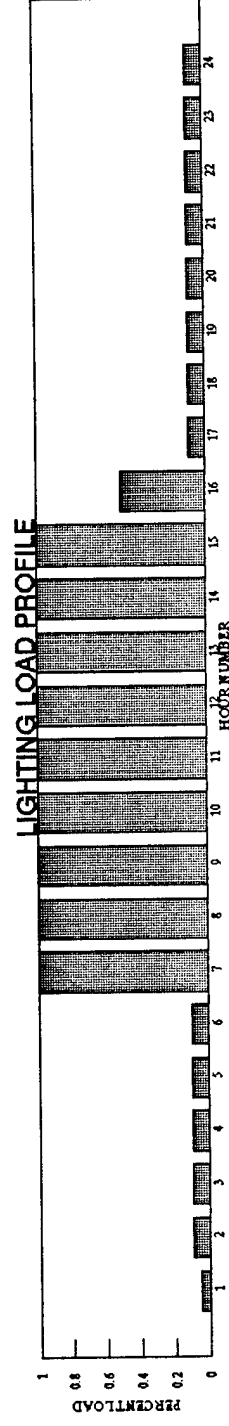
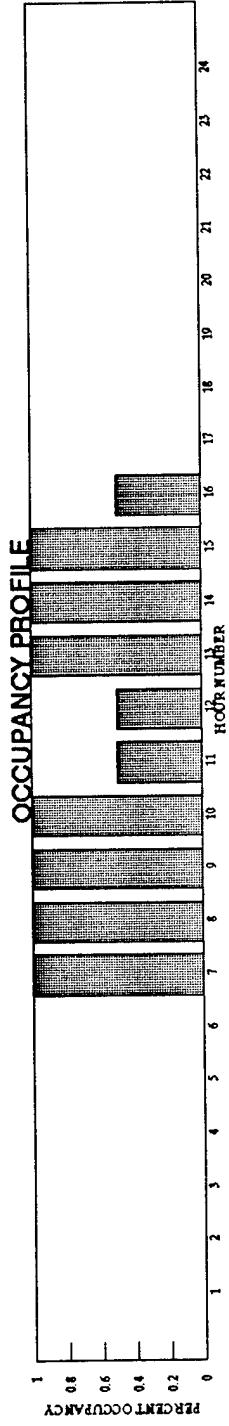
## Peak Value for Internal Gains

Peak Value for Internal Gains						
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage
3						
				TOTAL	ERR	

**E M C Engineers, Inc.**  
 PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 23-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 2100Z3  
 BLDG: 2100  
 ZONE: 3

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.5	1	1	1	1	0.5								
		PROCESS																								



# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000

DATE: 23-Feb-93

PREPARED BY: TMB

CHECKED BY: CEL

FILE: 2100Z4

BLDG: 2100

ZONE: 4

## **Rates of Heat Gain from Occupants of Conditioned Spaces**

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat (BTU/H)
4	50	5	Standing, light work, or walking slowly	Retail store, bank	270	220	13,500	11,000
TOTAL	50					TOTAL	13,500	11,000

## **Peak Wattage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
4	96	7	Fluorescent, 3 - 34w lamps, 16w ballast (2x4 ft. fixture)	118	11,328
	12	21	Incandescent - 150w	150	1,800
	64	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	3,200
	6	60	Exit Light	20	120
TOTAL	178			TOTAL	16,448

## **Peak Value for Internal Gains**

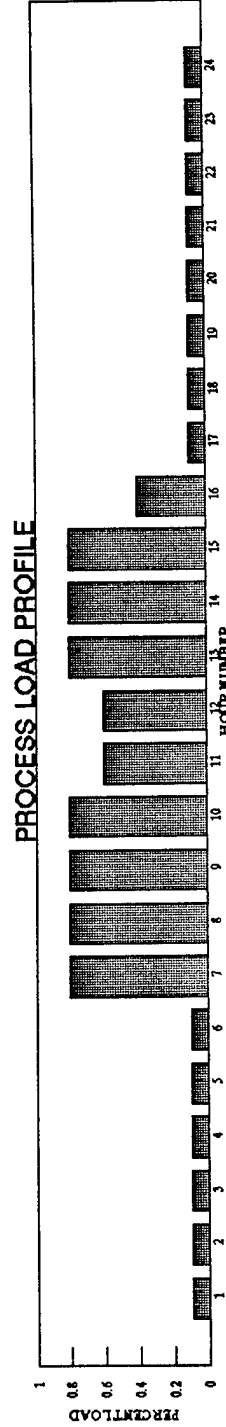
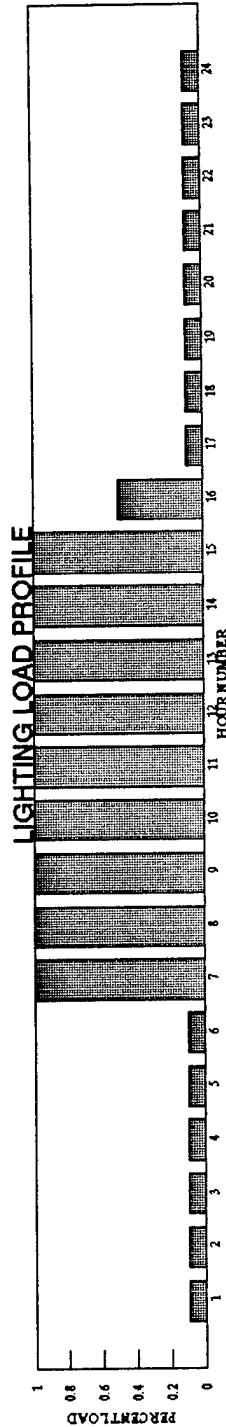
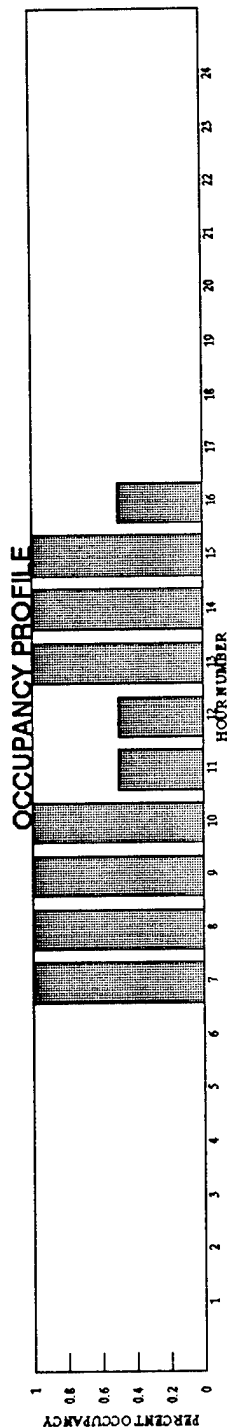
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
4	7	3	Microcomputer	350	91%	2,450	8,362
	4	5	Printer (laser)	870	34%	3,480	11,877
	1	45	Micro Fiche Machine	250	50%	250	853
	2	49	Radio	71	10%	142	485
	8	54	Refrigerator (Frostless 12 cu. ft.)	321	35%	2,568	8,765
	2	62	Television (Color, tube)	300	15%	600	2,048
	3	12	Typewriter	100	10%	300	1,024
	20		Optical Machine	120	10%	2,400	8,191
	7		X-ray Machine	460	10%	3,220	10,990
	11		Shot Machine	120	10%	1,320	4,505
	2		Hand Dryer	1,200	100%	2,400	8,191
TOTAL				TOTAL	40%	19,130	65,291

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 23-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 2100Z4  
 BLDG: 2100  
 ZONE: 4

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
3	Administration	OCCUPANCY							1	1	1	1	0.5	0.5	1	1	1	0.5									
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.1	0.8	0.8	0.8	0.8	0.6	0.6	0.8	0.8	0.8	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1



**EMC NO.:**

3204-000

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

DATE:

CLIENT CONTRACT NO.: DACA 41-92-C-0098

**PREPARED BY:**

CLIENT PROJ. ENG: DOUG CAGE

CEL

**LOCATION: FT. LEONARD WOOD**

**2100Z5**

**ZONE: 5**

### Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
5	6	5	Standing, light work, or walking slowly	Retail store, bank	270	220	1,620	1,320
TOTAL	6					TOTAL	1,620	1,320

Peak Wattage Value for Lights
-------------------------------

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
5	66	21	Incandescent - 150w	150	9,900
TOTAL	66			TOTAL	9,900

### Peak Value for Internal Gains

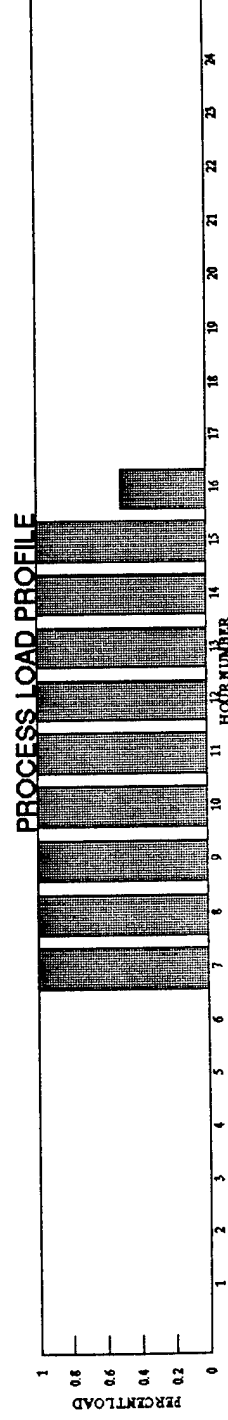
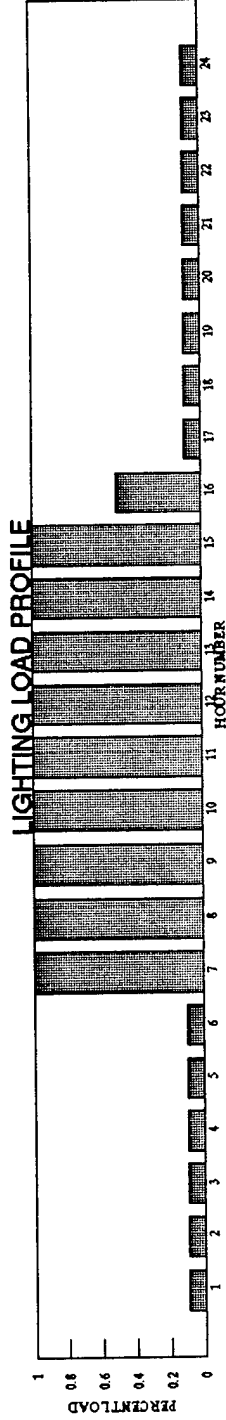
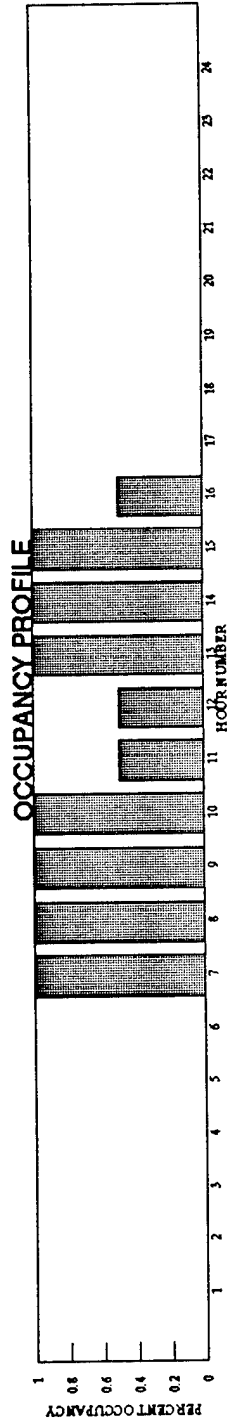
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
5	1	49 Rado		71	10%	71	242
	1	31 Fan (Circulating)		88	20%	88	300
			TOTAL		16%	159	543

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 23-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 2100Z5  
 BLDG: 2100  
 ZONE: 5

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	0.5	1	1	1	0.5								
		PROCESS							1	1	1	1	1	1	1	1	1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1



## EMC NO.: 3204-000

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

23-Feb-93

CLIENT CONTRACT NO.: DACA 41 -92 -C-0098

**PREPARED BY:**

CLIENT PROJ. ENG: DOUG CAGE

CHECKED BY: CEL

**LOCATION: FT. LEONARD WOOD**

FILE: 2100Z6

2100 ZONE: 6

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
6	15	4	Seated, light work, typing	Offices, hotels, apts	250	200	3,750	3,000
TOTAL	15					TOTAL	3,750	3,000

### Peak Wattage Value for Lights

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
6	92	7	Fluorescent, 3 – 34w lamps, 16w ballast (2x4 ft. fixture)	118	10,856
	25	5	Fluorescent, 1 – 34w lamp, 16w ballast (1x4 ft. fixture)	50	1,250
	3	60	Exit Light	20	60
	2	20	Incandescent – 100w	100	200
TOTAL	122			TOTAL	12,366

## Peak Value for Internal Gains

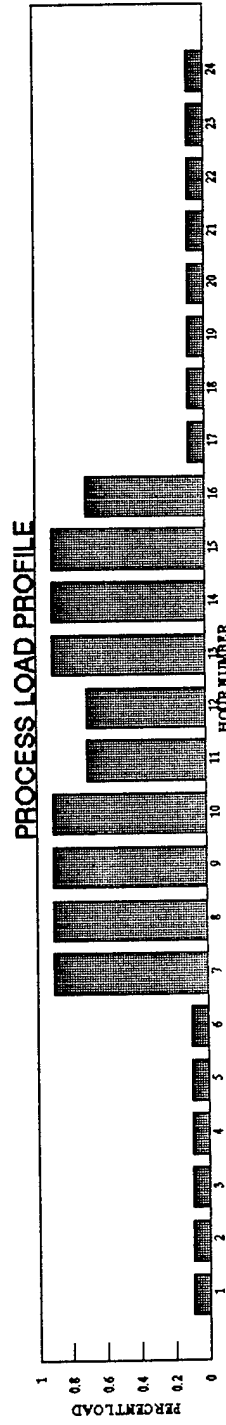
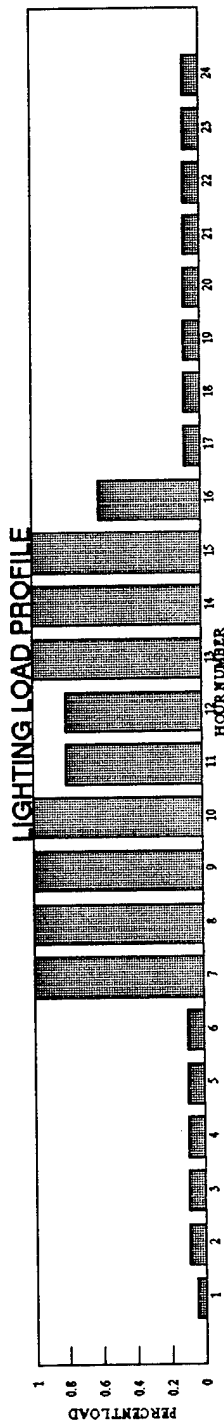
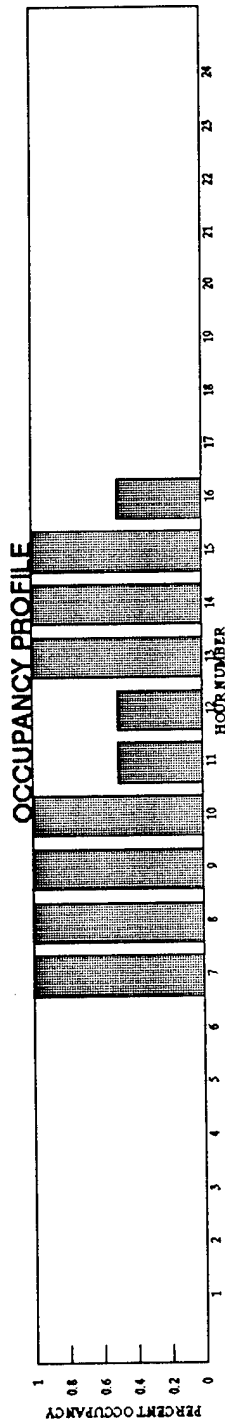
Peak Value for Internal Gains							
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
6	3		Microcomputer	350	91%	1,050	3,584
	2	5	Printer (laser)	870	34%	1,740	5,939
	2	49	Radio	71	10%	142	485
	1	12	Typewriter	100	10%	100	341
	1	46	Microwave Oven	600	65%	600	2,048
	1	76	Coffee Brewer	1,658	100%	1,658	5,659
	1	65	Vending Machine	700	36%	700	2,389
	2	54	Refrigerator (Frostless 12 cu. ft.)	321	35%	642	2,191
	1	45	Micro Fiche Machine	250	50%	250	853

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 23-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 210026  
 BLDG: 2100  
 ZONE: 6

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.5	0.5	1	1	1	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.1	0.9	0.9	0.9	0.9	0.7	0.7	0.9	0.9	0.9	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1





EMC NO.:

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41-92-C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
DATE: 23-Feb-93  
PREPARED BY: TMB  
CHECKED BY: CEL  
FILE: 2100Z7  
BLDG: 2100

7

### Rates of Heat Gain from Occupants of Conditioned Spaces

Rates of Heat Gain from Occupants of Conditioned Spaces							
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat (BTU/H)
7	70	4	Seated, light work, typing	Offices, hotels, apts	250	200	17 500
							14 000
TOTAL	70					TOTAL	17 500
							14 000

### Peak Wattage Value for Lights

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
7	12	31	Tungsten-Halogen - 400w	400	4 800
	31	21	Incandescent - 150w	150	4 650
	8	22	Incandescent - 300w	300	2 400
	15	18	Incandescent - 60w	60	900
	11	7	Fluorescent, 3 - 34w lamps, 16w ballast (2x4 ft. fixture)	118	1 298
	7	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	588
	10	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	500
	4	60	Exit Light	20	80
TOTAL	98			TOTAL	15 216

## Peak Value for Internal Gains

<b>Peak Value for Internal Gains</b>						
<b>Zone No.</b>	<b>No. of Equipment</b>	<b>Equip. Type</b>	<b>Description</b>	<b>Average Wattage</b>	<b>Heat Gain to Space(%)</b>	Total <b>(BTU)</b>
7	2	76	Coffee Brewer	1858	100%	11,318
	2	46	Microwave Oven	600	65%	4,096
	1	49	Radio	71	10%	242
	1	65	Vending Machine	700	36%	2,369
	1	54	Refrigerator (Frostless 12 cu. ft.)	321	35%	1,096
				TOTAL	80%	19,140

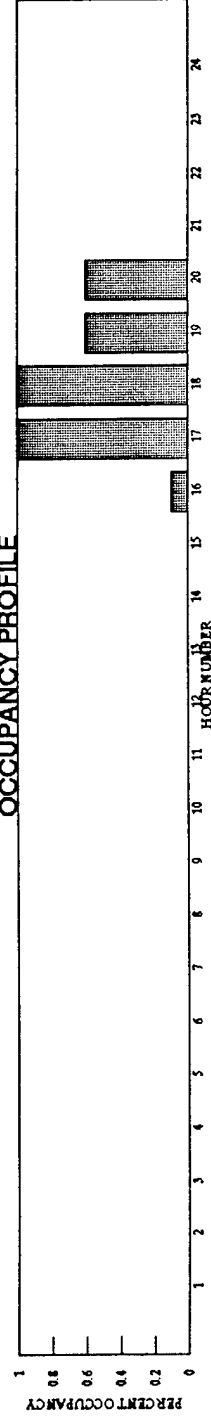
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

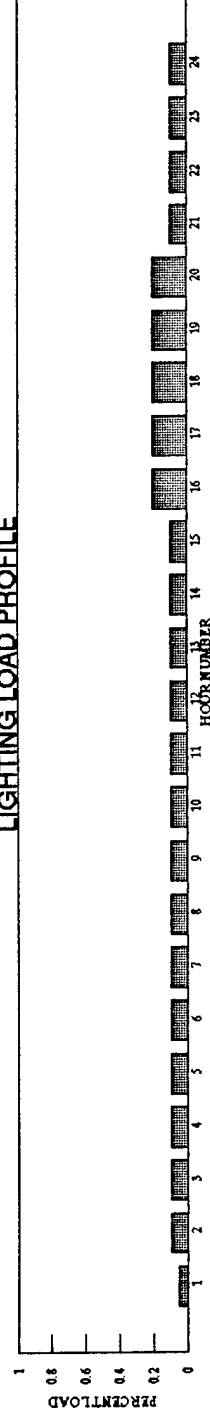
EMC NO.: 3204-000  
 DATE: 23-Feb-93  
 PREPARED BY: TMB  
 CHECKED BY: CEL  
 FILE: 2100Z7  
 BLDG: 2100  
 ZONE: 7

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Auditorium	OCCUPANCY																0.1	1	1	0.6	0.6				
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.8	0.8	0.8	0.5	0.1	0.1	0.1	0.1

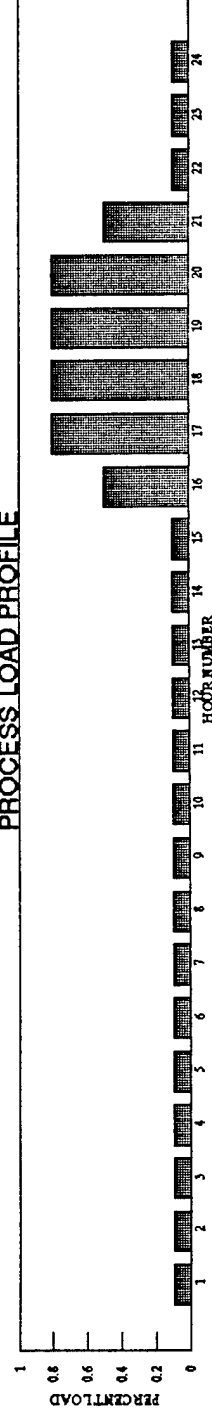
OCCUPANCY PROFILE



LIGHTING LOAD PROFILE



PROCESS LOAD PROFILE



## 01 Card - Job Information

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Project: KEAP STUDY, EXPANSION OF EMCS  
 Location: FT. LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: E M C ENGINEERS, INC.

## -----CARD 08-- Climatic Information-----

	Summer	Winter	Summer	Summer	Winter		Summer	Winter
Weather	Clearness	Clearness	Design	Design	Design	Building	Ground	Ground
Code	Number	Number	Dry Bulb	Wet Bulb	Dry Bulb	Orientation	Reflect	Reflect
SPRINGFM	.97	.97	94	78	3			

## -----CARD 09-- Load Simulation Periods-----

1st Month	Last Month	Peak	1st Month	Last Month	1st Month	Last Month
Cooling	Cooling	Cooling	Summer	Summer	Daylight	Daylight
Simulation	Simulation	Load Hr	Period	Period	Savings	Savings
MAY	SEP		JUN	SEP	APR	OCT

## -----CARD 10 -- Load Simulation Parameters-----

Cooling	Heating		Airflow	Airflow	Room	Put Wall
Load	Load	Ventilation	Input	Output	Circulation	RA Load
Method	Method	Method	Units	Units	Rate	to Room
TETD-TA1	TETD-TA1	OADB	ACTUAL	ACTUAL	MED-RCR	NO

## -----CARD 11-- Energy Simulation Parameters-----

1st Month	Last Month	Level			Building
Energy	Energy	Of	Holiday	Calendar	Floor
Simulation	Simulation	Calculation	Code	Code	Area
JAN	DEC	ROOM	1978	1978	74789

## -----CARD 13-- Daylighting Parameters-----

-----Atmospheric-----

---Moisture--- ---Turbidity--- ---Inside Visible Reflectivity--- Daylighting

Summer	Winter	Summer	Winter	Floor	Ceiling	Wall	Partition	Geometry
		.07	.07					

## ----- Load Section Alternative #1 -----

## ---- Load Alternative ----

Number	Description
1	BLDG 2100 BASERUN FT LEONARD WOOD

## -----CARD 20-- General Room Parameters -----

Room Number	Zone Reference Number	Room Descrip	Floor Length	Floor Width	Const Type	Plenum Height	Acoustic Ceiling Resistance	Floor to Floor Height	Duplicate Floors Multiplier	Duplicate Rooms per Zone	Perimeter Depth
1	1	ADMIN OFFICES	187.16	100	2	0		12			
2	2	COMPUTER ROOM	86.1	10	2	0		12			
3	3	ASSEMBLY HALL	100	76.67	2	0		18.9			
4	4	MEDICAL CLINIC	100	141.42	2	0		12			
5	5	CLOTHING ISSUE	100	126.8	2			20			
6	6	OFFICES-STORE	100	132.22	2	0		12			
7	7	CHAPEL-AUDTRM	100	75.01	2	0		17.7			

## -----CARD 21-- Thermostat Parameters -----

Room Number	Cooling Room Design DB	Room RH	Cooling T'stat Driftpoint	Room T'stat Schedule	Heating Room Design DB	Room T'stat Driftpoint	Heating T'stat Schedule	Heating T'stat Location Flag	T'stat Location	Mass / No. Hrs Average	Carpet On Floor
M	75			CLG75SUM	70			HTG70WNT	ROOM	MED70	NO
1											YES
2				CLG75				HTGOFF			
3											YES
4											YES
5											YES
6											YES
7											YES

## -----CARD 22-- Roof Parameters -----

Room Number	Roof Number	Roof Equal to Floor?	Roof Length	Roof Width	Roof U-Value	Const Type	Roof Direction	Roof Tilt	Roof Alpha
M	1				.029	50			.74
1	1	YES							
2	1	YES							
3	1	NO	100	80.81					
4	1	NO	141.87	100					
5	1	YES							
6	1	NO	100	98.87					
7	1	NO	100	79.63					

## -----CARD 26-- Schedules -----

Room					Reheat	Cooling	Heating	Auxiliary	Room	Daylighting
Number	People	Lights	Ventilation	Infiltration	Minimum	Fans	Fan	Fan	Exhaust	Controls
1	P2100	L2100	AVAIL	AVAIL		AVAIL	AVAIL			
2	P2100	L2100	AVAIL	AVAIL		AVAIL	AVAIL			
3	P2100	L2100Z3	AVAIL	AVAIL		AVAIL	AVAIL			
4	P2100	L2100Z3	AVAIL	AVAIL		AVAIL	AVAIL			
5	P2100	L2100Z3	AVAIL	AVAIL		AVAIL	AVAIL			
6	P2100	L2100	AVAIL	AVAIL		AVAIL	AVAIL			
7	P2100Z7	L2100Z7	AVAIL	AVAIL		AVAIL	AVAIL			

## -----CARD 27-- People and Lights -----

Room	People	People	People	People	Lighting	Lighting	Lighting	Ballast	Percent	--- Daylighting ---
Number	Value	Units	Sensible	Latent	Value	Units	Fixture Type	Factor	Lights to Ret. Air	Reference Point 1
M		PEOPLE				WATTS	RECFL-NV			Reference Point 2
1	112		250	200	24560					
2	6		255	255	1176	WATTS	RECFL-NV	1		
3	130	PEOPLE	230	190	15500	WATTS	RECFL-NV	1		
4	135	PEOPLE	230	190	14200	WATTS	RECFL-NV	1		
5	7	PEOPLE	315	325	15800	WATTS	RECFL-NV	1		
6	15	PEOPLE	315	325	12800	WATTS	RECFL-NV	1		
7	75	PEOPLE	210	140	12600	WATTS	RECFL-NV	1		

## -----CARD 28--- Miscellaneous Equipment -----

Room	Misc		Energy	Energy	Energy	Percent	Percent	Percent		
Number	Equipment	Equipment	Consump	Consump	Schedule	Meter	of Load	Misc. Load	Misc. Sens	Radiant
M	Number	Descrip	Value	Units	Code	Code	Sensible	to Room	to Ret. Air	Fraction
	1			WATTS		ELEC				Optional
1	1	OFFICE EQUIP.	71896		E2100Z1			53		Air Path
2	1	OFFICE EQUIP.	23200		E2100Z2			62		SAME-RA
4	1	MEDICAL EQUIP.	19130		E2100Z4			40		
5	1	EQUIPMENT	159		E2100Z5			16		
6	1	OFFICE EQUIP.	6882		E2100Z6			62		
7	1	APPLIANCES	5608		E2100Z7			80		

## -----CARD 29--- Room Airflows -----

Room										
Number	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
M		CFM		CFM		CFM		CFM		
1	1260		1260		963		963			
2					80		80			
3	770		770		445		445			
4	1270		1270		664		664			
5	770		770		662		662			
6	700		700		277		277			
7	2400		2400		740		740			

## -----CARD 24-- Wall Parameters -----

Room Number	Wall Number	Wall Length	Wall Height	Wall U-Value	Wall	Wall Direction	Wall Tilt	Wall Alpha	Ground
					Constuc Type				Reflectance Multiplier
M	1				89			.74	
1	1	100	27.16	.094		0			
1	2	100	18.62	.092		180			
1	3	100	11.2	.103		90			
1	4	100	24.64	.1		270			
2	1	57.4	10	.092		180			
2	2	29.4	10	.092		270			
3	1	115.7	10	.092		0			
3	2	138.1	10	.097		180			
3	3	48.6	10	.092		90			
3	4	48.6	10	.092		270			
4	1	10.8	10	.092		0			
4	2	100	36.98	.094		180			
4	3	99	10	.092		90			
4	4	91	10	.092		270			
5	1	100	30.45	.135		0			
5	2	96.9	10	.092		90			
5	3	100	14.28	.092		270			
6	1	100	14.98	.101		0			
6	2	72.8	10	.109		90			
7	1	100	15.66	.105		0			
7	2	100	16.32	.092		180			
7	3	100	14.28	.096		90			
7	4	100	15.96	.096		270			

## -----CARD 25-- Wall/Glass Parameters -----

Room Number	Wall Number	Glass Length	Glass Width	Pct Glass or No. of Windows	Glass U-Value	Shading Coefficient	External	Internal	Percent		Inside
							Shading Type	Shading Type	Solar Ret.	Visible Transmittance	Visible Reflectance
M	1			1	.621	.58		3		.8	
1	1	20.3	10								
1	2	18.2	10								
1	4	24	10								
2	1	10	9.3								
2	2	10	2.7								
3	1	10	17.1								
3	2	34.4	10								
3	3	10	8.5								
3	4	12.8	10								
4	2	49.4	10								
4	3	12.8	10								
4	4	12.8	10								
6	1	10	5.3								
7	1	34.9	10								

## -----CARD 30- Fan Airflows-----

Room Number	-----Main-----		-----Auxiliary-----		-----Room Exhaust-----	
	Value	Units	Value	Units	Value	Units
M		CFM		CFM		
1	12530				12870	
2	5600					
3	7670		7670			
4	12690				3240	
5	7710		7710			
6	7010				1980	
7	12000		12000			

## -----CARD 31-- Partition Parameters-----

Room Number	Partition Number	Partition Length	Partition Height	Partition U-Value	Const Type	Temp Flag	Cooling Temp	Heating Temp	Adjacent Room No
M	1				105	CONSTANT			
1	1	1303	8.5						
2	1	59	8.5						
3	1	315	23.3						
4	1	617.2	15						
5	1	250	23.5						
6	1	639	12						
7	1	393.2	23.3						

## -----CARD 32-- Exposed Floor Parameters-----

Room Number	Exposed		-----Slab-----		-----Exposed Floor-----		-----Room Exhaust-----	
	Floor Number	Perimeter Length	Loss Coefficient	Floor Area	Floor U-Value	Const Type	Temp Flag	Temp
1	1	627	.83					
2	1	62	.83					
3	1	16	.83					
4	1	219	.83					
5	1	199	.83					
6	1	132	.83					
7	1	232	.83					

## -----CARD 34-- Internal Shading-----

Shading Type	Overall		-----Lockouts-----		-----Room Exhaust-----	
	U-Value	Shading Coefficient	Schedule Code	Shade Location	Visible Transmittance	Temp
3	.452	.58	FL-INSHD			

-----CARD 39-- System Alternative -----

-----CARD 40--- System Type -----

-----OPTIONAL VENTILATION SYSTEM-----

-----CARD 41-- Zone Assignment -----

-----CARD 42--- Fan SP and Duct Parameters-----

-----CARD 43-- Airflow Design Temperatures -----

System Set	Minimum Cooling	Maximum Cooling	Minimum Heating	Maximum Heating	Minimum Cooling	Maximum Cooling	Minimum Preheat	Maximum Preheat	Minimum Room	Design Ht Rec
------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	--------------	---------------



## -----CARD 43-- Airflow Design Temperatures -----

System	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Design
Set	Cooling	Cooling	Heating	Heating	Cooling	Cooling	Preheat	Preheat	Room	Ht Rec
Number	SADB	SADB	SADB	SADB	Lv DB	Lv DB	Lv DB	Lv DB	RH	Diff
2										
3										
4										
5										
6										
7	68.6	68.6								

## -----CARD 44-- System Options -----

System	Econ	Econ	Max Pct	Direct	Indirect	1st Stage	----- Exhaust Air Heat Recovery -----			
Set	Type	On	Outside	Evap	Evap	Evap	Fan	--- Effectiveness ---	--- Control Method ---	
Number	Flag	Point	Air	Cooling	Cooling	Cooling	Cycling	System	Room	System
1	DRY-BULB	65	100							
2										
3	DRY-BULB	65	100							
4	DRY-BULB	65	100							
5										
6	DRY-BULB	65	100							
7										

## -----CARD 45--- Equipment Schedules -----

System	Main		Direct	Indirect	Auxiliary	Main	Main			Auxiliary
Set	Cooling		Evap	Evap	Cooling	Heating	Preheat	Reheat	Mech.	Heating
Number	Coil	Economizer	Coil	Coil	Coil	Coil	Coil	Coil	Humidity	Coil
1	FLCCOIL	AVAIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	FLHCOIL
2	AVAIL	OFF	OFF	OFF	OFF	OFF	OFF	OFF	AVAIL	OFF
3	FLCCOIL	AVAIL	OFF	OFF	OFF	FLHCOIL	OFF	OFF	OFF	OFF
4	FLCCOIL	AVAIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	FLHCOIL
5	OFF	OFF	OFF	OFF	OFF	AVAIL	FLHCOIL	OFF	OFF	OFF
6	FLCCOIL	AVAIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	FLHCOIL
7	FLCCOIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	OFF	OFF

## -----CARD 48-- Cooling Capacity Overrides -----

System		Misc	-----MAIN COOLING-----				---AUX COOLING---	
Set	People	Lights	Loads	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Variance	Variance	Variance	Value	Units	Sizing	Location	Value
1				535.9	MBH			
2				122.6	MBH			
3				371.3	MBH			
4				539.9	MBH			



## -----CARD 62-- Cooling Equipment Parameters -----

Cool Equip				---COOLING---				---HEAT RECOVERY---				Seq	Demand
Ref	Code	Of		--Capacity--	---Energy---		--Capacity--	---Energy---		Order	Seq	Limit	
Num	Name	Units	Value	Units	Value	Units	Value	Units	Value	Units	Num	Type	Number
3	EQ1161	1	10	TONS									

## -----CARD 63-- Cooling Pumps and References -----

Cool ---CHILLED WATER---				---CONDENSER---		---HT REC or AUX---		Switch-			
Ref	Full Load	Value	Units	Full Load	Value	Full Load	Value	over	Cold	Cooling	Misc.
Num	Value	Units	Value	Units	Value	Units	Control	Storage	Tower	Access.	
1	124		FT-WATER								

## -----CARD 65-- Heating Load Assignment -----

Load	All Coil	-Group 1-		-Group 2-		-Group 3-		-Group 4-		-Group 5-		-Group 6-		-Group 7-		-Group 8-		-Group 9-	
Assignment	Loads To	Heating Ref	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End	Begin End		
1	1	1	1 3	3 4	4 5	5 6	6 7	7 7											
2	2	1	1 3	3 4	4 5	5 6	6 7	7 7											

## -----CARD 67-- Heating Equipment Parameters -----

Heat	Equip	Number	HW Pmp	Cap'y		Energy	Seq	Switch	Demand		
Ref	Code	Of	Full Ld	Value	Units	Rate	Order	over	Hot	Misc.	Limit
Number	Name	Units	Value	Units	Value	Units	Number	Control	Strg	Acc.	Cogen
1	EQ2001	1	3.73	KW	2400	MBH	80	PCTEFF	1		
2	EQ2001	1	3.73	KW	2400	MBH	80	PCTEFF	2		

## -----CARD 69-- Fan Equipment Parameters -----

System	Cooling	Heating	Return	Exhaust	Auxiliary	Room	Optional
Set	Fan	Fan	Fan	Fan	Supply	Exhaust	Ventilation
Number	Fan	Fan	Fan	Fan	Supply	Exhaust	Ventilation
1	EQ4002				EQ4003		
2	EQ4003						
3	EQ4002						
4	EQ4002				EQ4003		
5	EQ4002						
6	EQ4002				EQ4003		
7	EQ4002						

## -----CARD 70-- Fan Equipment KW Overrides -----

-----MAIN SYSTEM-----				---OTHER SYSTEM---				---DEMAND LIMIT PRIORITY---			
System	Cool	Heat	Ret	Exh	Aux	Room	Opt	Room	Opt	Room	Opt
Set	Fan	Fan	Fan	Fan	Sup	Exh	Vent	Cool	Heat	Aux	Exh
Number	KW	KW	KW	KW	KW	KW	KW	Fan	Fan	Fan	Fan
1	13.055				2.66						

-----MAIN SYSTEM----- --OTHER SYSTEM-- -----DEMAND LIMIT PRIORITY----

----- Load Section Alternative #2 -----

Number	Description
2	BLDG 2100 NIGHT SETBACK FT LEONARD WOOD

-----CARD 20-- General Room Parameters -----												
Zone								Acoustic	Floor to	Duplicate	Duplicate	Perimeter
Room	Reference	Room	Floor	Floor	Const	Plenum	Ceiling	Floor	Floors	Rooms per	Depth	
Number	Number	Descrip	Length	Width	Type	Height	Resistance	Height	Multiplier	Zone		
1	1	ADMIN OFFICES	187.16	100	2	0		12				
2	2	COMPUTER ROOM	86.1	10	2	0		12				
3	3	ASSEMBLY HALL	100	76.67	2	0		18.9				
4	4	MEDICAL CLINIC	100	141.42	2	0		12				
5	5	CLOTHING ISSUE	100	126.8	2			20				
6	6	OFFICES-STORE	100	132.22	2	0		12				
7	7	CHAPEL-AUDTRM	100	75.01	2	0		17.7				

[illegible]

## Utility Description Reference Table

## Schedules:

AVAIL AVAILABLE (100%)  
CDDC78SM CLG DDC T-STAT AT 78 (MAY THRU SEPT)  
CLG75 COOLING TSTAT SCHEDULE - 75  
CLG75SUM COOLING TSTAT AT 75 (MAY THRU SEPT)  
CSB75SUM COOLING SB TSTAT AT 75 (MAY THRU SEPT)  
E2100Z1 EQUIPMENT SCHEDULE - BLDG 2100 ZONE 1  
E2100Z2 EQUIPMENT SCHEDULE - BLDG 2100 ZONE 2  
E2100Z4 EQUIPMENT SCHEDULE - BLDG 2100 ZONE 4  
E2100Z5 EQUIPMENT SCHEDULE - BLDG 2100 ZONE 5  
E2100Z6 EQUIPMENT SCHEDULE - BLDG 2100 ZONE 6  
E2100Z7 EQUIPMENT SCHEDULE - BLDG 2100 ZONE 7  
FL-INSHD INTERNAL SHADING: VENITIAN BLINDS  
FLCCOIL COOLING COIL SCHEDULE - MAY THRU SEPT  
FLECOIL HEATING COIL SCHEDULE - OCT THRU APR  
EDDC68WT HEATING DDC T-STAT AT 68 (OCT TO APR)  
HSB70WNT HEATING SB T-STAT AT 70 (OCT TO APR)  
HTG70WNT HEATING T-STAT AT 70 (OCT TO APR)  
HTGOFF HEATING ALWAYS OFF  
L2100 LIGHTING SCHEDULE - BLDG 2100 ZONE 8  
L2100Z3 LIGHTING SCHEDULE - BLDG 2100 ZONE 3  
L2100Z7 LIGHTING SCHEDULE - BLDG 2100 ZONE 7  
OFF ALWAYS OFF  
P2100 PEOPLE SCHEDULE - BLDG 2100 ZONE 8  
P2100Z7 PEOPLE SCHEDULE - BLDG 2100 ZONE 7

## System:

PTAC PACKAGED TERMINAL AIR COND.  
SZ SINGLE ZONE  
VAVFSK VAV WITH FORCED FLO SKIN

## Equipment:

## Cooling:

EQ1100L AIR-CLD RECIP >45 TONS  
EQ1161 AIR-CLD COND COMP <15 TONS

## Heating:

EQ2001 GAS FIRE TUBE HOT WATER

## Fan:

EQ4002 B1 CENTRIF. FAN C.V.  
EQ4003 FC CENTRIF. FAN C.V.

Schedule Name: AVAIL  
Project: AVAILABLE (100)  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: HTG  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

-----  
0 100  
24

Schedule Name: CDDC78SM

Project: CLG DDC T-STAT AT 78 (MAY THRU

Location:

Client:

Program User:

Comments: CLG DDC T-STAT AT 78 (MAY THRU

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

```

-----
0      100
24
    
```

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

```

-----
0      90
6      78
19     90
24
    
```

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

```

-----
0      100
24
    
```

Schedule Name: CLG75

Project: COOLING TSTAT SCHEDULE - 75

Location:

Client:

Program User:

Comments: COOLING THERMOSTAT - SET AT 75

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 75

24



Schedule Name: CLG75SUM  
Project: COOLING TSTAT AT 75 (MAY THRU S  
Location:  
Client:  
Program User:  
Comments: COOLING TSTAT AT 75 (MAY THRU

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature  
-----  
0 100  
24

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature  
-----  
0 75  
24

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature  
-----  
0 100  
24

Schedule Name: CSB75SUM

Project: COOLING SB TSTAT AT 75 (MAY THR

Location:

Client:

Program User:

Comments: COOLING SB TSTAT AT 75 (MAY TH

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	100
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	90
6	75
19	90
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	100
24	

Schedule Name: E2100Z1  
Project: EQUIPMENT SCHEDULE - BLDG 2100  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ZONE 1

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	4
7	100
16	60
17	4
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	4
24	

Schedule Name: E2100Z2  
Project: EQUIPMENT SCHEDULE - BLDG 2100  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ZONE 2

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

-----  
0 70  
7 100  
16 90  
17 70  
24

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

-----  
0 70  
24

Schedule Name: E2100Z4  
Project: EQUIPMENT SCHEDULE - BLDG 2100  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ZONE 4

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	10
7	80
16	40
17	10
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	10
24	

Schedule Name: E2100Z5

Project: EQUIPMENT SCHEDULE - BLDG 2100

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: EQUIPMENT SCHEDULE - ZONE 5

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	0
7	80
16	50
17	0
24	

Starting Month: JAN Ending Month: DEC

Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
24	

Schedule Name: E2100Z6  
Project: EQUIPMENT SCHEDULE - BLDG 2100  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ZONE 6

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

-----  
0 10  
7 90  
11 70  
13 90  
16 70  
17 10  
24

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

-----  
0 10  
24

Schedule Name: E2100Z7  
Project: EQUIPMENT SCHEDULE - BLDG 2100  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - ZONE 7

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	10
16	50
17	80
21	50
22	10
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	10
24	



Schedule Name: FL-INSHD  
Project: INTERNAL SHADING: VENITIAN BLIN  
Location: FT LEONARD WOOD  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: INTERNAL SHADING SCHEDULE

Starting Month: JAN Ending Month: APR  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util	Percent
0	75	
24		

Starting Month: MAY Ending Month: SEP  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util	Percent
0	35	
24		

Starting Month: OCT Ending Month: DEC  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util	Percent
0	75	
24		

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util	Percent
0	25	
24		

Schedule Name: FLCOIL  
Project: COOLING COIL SCHEDULE - MAY TH  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: COOLING COIL SCHEDULE - MAY TH

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	0
24	

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	100
24	

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	0
24	

Schedule Name: FLHCOIL  
Project: HEATING COIL SCHEDULE - OCT TH  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: HEATING COIL SCHEDULE - OCT TH

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	100
24	

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	0
24	

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	100
24	

Schedule Name: HDDC58WT

Project: HEATING DDC T-STAT AT 68 (OCT T

Location:

Client:

Program User:

Comments: HEATING DDC T-STAT AT 68 (OCT

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	68
19	55
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	35
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	68
19	55
24	

Schedule Name: HSB70WNT

Project: HEATING SB T-STAT AT 70 (OCT TO

Location:

Client:

Program User:

Comments: HEATING SB T-STAT AT 70 (OCT T

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	70
19	55
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	35
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	70
19	55
24	

Schedule Name: HTG70WNT

Project: HEATING T-STAT AT 70 (OCT TO AP

Location:

Client:

Program User:

Comments: HEATING T-STAT AT 70 (OCT TO A

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 70  
24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 35  
24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 70  
24

Schedule Name: ETCOFF  
Project: HEATING ALWAYS OFF  
Location:  
Client:  
Program User:  
Comments: HEATING ALWAYS OFF

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 0  
24

Schedule Name: L2100

Project: LIGHTING SCHEDULE - BLDG 2100 Z

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: LIGHTING SCHEDULE - DINING FAC

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	10
6	100
9	50
11	100
14	50
16	100
19	10
24	



Schedule Name: L2100Z3

Project: LIGHTING SCHEDULE - BLDG 2100 Z

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: LIGHTING SCHEDULE - ZONE 3

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	10
7	100
11	100
13	100
16	60
17	10
24	

Starting Month: JAN Ending Month: DEC

Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	10
24	

Schedule Name: L2100Z7

Project: LIGHTING SCHEDULE - BLDG 2100 Z

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: LIGHTING SCHEDULE - AUDITORIUM

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SAT

Hour Util Percent

Hour	Util Percent
0	10
16	20
21	10
24	

Starting Month: JAN Ending Month: DEC

Starting Day Type: SUN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	10
10	100
12	10
16	20
21	10
24	

Schedule Name: OFF  
Project: ALWAYS OFF  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: ETG  
Starting Day Type: DSCN Ending Day Type: SUN

Hour	Util	Percent
0	0	
24		

Schedule Name: P2100  
Project: PEOPLE SCHEDULE - BLDG 2100 ZON  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - DINING FACIL

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
6	20
7	100
8	50
9	20
11	50
12	100
13	50
14	20
17	100
18	50
19	0
24	

Schedule Name: P2100Z7

Project: PEOPLE SCHEDULE - BLDG 2100 ZON

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: PEOPLE SCHEDULE - AUDITORIUM

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SAT

Hour Util Percent

Hour	Util Percent
0	0
16	10
17	100
19	60
21	0
24	

Starting Month: JAN Ending Month: DEC

Starting Day Type: SUN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
10	100
12	0
16	10
17	100
19	60
21	0
24	

```
*****
*****
**
**          T R A C E    6 0 0    A N A L Y S I S          **
**
**          by          **
**
*****
*****
```

EEAP STUDY, EXPANSION OF EMCS  
FT. LEONARD WOOD, MO  
US ARMY  
E M C ENGINEERS, INC.

Weather File Code:	SPRINGFM
Location:	SPRINGFIELD, MISSOURI
Latitude:	37.0 (deg)
Longitude:	93.0 (deg)
Time Zone:	6
Elevation:	1,265 (ft)
Barometric Pressure:	28.5 (in. Hg)
Summer Clearness Number:	0.97
Winter Clearness Number:	0.97
Summer Design Dry Bulb:	94 (F)
Summer Design Wet Bulb:	78 (F)
Winter Design Dry Bulb:	3 (F)
Summer Ground Relectance:	0.20
Winter Ground Relectance:	0.20
Air Density:	0.0724 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0621 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,675.1 (Btu-min./hr/cuft)
Enthalpy Factor:	4.3449 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: TETD/Time Averaging

Time/Date Program was Run: 13:29:13 3/17/93  
Dataset Name: 2100 .TM

AIRFLOW - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	VAVFSK	1,260	12,530	0	13,493	12,530	12,870	0
2	PTAC	0	5,600	0	5,680	80	0	0
3	SZ	770	7,670	7,670	8,115	7,670	0	0
4	VAVFSK	1,270	10,740	0	11,404	10,740	3,240	0
5	SZ	770	0	7,710	8,372	1,432	0	0
6	VAVFSK	700	5,032	0	5,309	5,032	1,980	0
7	SZ	2,400	12,000	12,000	12,740	3,140	0	0
Totals		7,170	53,572	27,380	65,113	40,624	18,090	0

CAPACITY - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	VAVFSK	44.7	0.0	0.0	44.7	0	-244,800	-159,900	0	0	0	-404,700
2	PTAC	10.2	0.0	0.0	10.2	0	0	-376,259	0	0	0	0
3	SZ	30.9	0.0	0.0	30.9	-319,200	0	0	0	0	0	-319,200
4	VAVFSK	45.0	0.0	0.0	45.0	0	-275,700	-317,300	0	0	0	-593,000
5	SZ	0.0	0.0	0.0	0.0	-397,200	0	0	0	0	0	-397,200
6	VAVFSK	21.8	0.0	0.0	21.8	0	-111,300	-183,600	0	0	0	-294,900
7	SZ	46.9	0.0	0.0	46.9	-438,800	0	-136,938	0	0	0	-438,800
Totals		199.5	0.0	0.0	199.5	-1,155,200	-631,800	-1,173,998	0	0	0	-2,447,800

The building peaked at hour 15 month 7 with a capacity of 125.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BLDG 2100 BASERUN FT LEONARD WOOD

----- E N G I N E E R I N G   C H E C K S -----										
System Number	Main/ Auxiliary	System Type	Percent	----- Cooling -----				--- Heating ---		Floor Area Sq Ft
			Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	VAVFSK	10.06	0.67	280.6	419.1	28.63	0.00	-8.54	18,716
1	Auxiliary	VAVFSK	0.00	0.69	0.0	0.0	0.00	0.00	-13.08	18,716
2	Main	PTAC	0.00	6.50	548.1	84.3	142.39	0.00	0.00	861
3	Main	SZ	10.04	1.00	247.9	247.8	48.43	1.00	-41.63	7,667
4	Main	VAVFSK	11.82	0.76	238.7	314.3	38.18	0.00	-22.44	14,142
4	Auxiliary	VAVFSK	0.00	0.23	0.0	0.0	0.00	0.00	-19.50	14,142
5	Main	SZ	9.99	0.00	0.0	0.0	0.00	0.61	-31.32	12,680
6	Main	VAVFSK	13.91	0.38	230.7	606.1	19.80	0.00	-13.89	13,222
6	Auxiliary	VAVFSK	0.00	0.15	0.0	0.0	0.00	0.00	-8.42	13,222
7	Main	SZ	20.00	1.60	256.0	160.0	75.00	1.60	-58.50	7,501



System 1 Block VAVFSK - VAV WITH FORCED FLO SKIN

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
Peaked at Time ==> Mo/Hr: 7/15 \* Mo/Hr: 7/15 \* Mo/Hr: 0/0  
Outside Air ==> OADB/WB/HR: 94/ 78/124.0 \* OADB: 94 \* OADB: 0

	Space	Ret. Air	Ret. Air	Net	Percnt		Space	Percnt		Space Peak	Coil Peak	Percn
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of To
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Roof Cond	38,808	0		38,808	7.60	*	38,808	18.15	*	0	0	0.0
Glass Solar	24,812	0		24,812	4.86	*	24,812	11.60	*	0	0	0.0
Glass Cond	7,032	0		7,032	1.38	*	7,032	3.29	*	0	0	0.0
Wall Cond	10,402	0		10,402	2.04	*	10,402	4.87	*	0	0	0.0
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.0
Infiltration	55,376			55,376	10.85	*	19,433	9.09	*	0	0	0.0
Sub Total==>	136,430	0		136,430	26.74	*	100,486	47.00	*	0	0	0.0
Internal Loads												
Lights	81,309	0		81,309	15.93	*	81,309	38.03	*	0	0	0.0
People	47,880			47,880	9.38	*	25,480	11.92	*	0	0	0.0
Misc	130,052	0	0	130,052	25.49	*	130,052	60.83	*	0	0	0.0
Sub Total==>	259,241	0	0	259,241	50.80	*	236,841	110.77	*	0	0	0.0
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Outside Air	0	0	0	72,455	14.20	*	0	0.00	*	0	0	0.0
Sup. Fan Heat				42,174	8.26	*		0.00	*		0	0.0
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.0
OV/UNDR Sizing	0			0	0.00	*	-123,523	-57.77	*	0	0	0.0
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.0
Grand Total==>	395,670	0	0	510,299	100.00	*	213,804	100.00	*	0	0	0.0

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	44.7	535.9	425.2	19,769	76.2	63.5	71.7	56.9	54.3	61.9	18,716	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	11,076	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	627	
Totals	44.7	535.9									Roof	18,716
											Wall	8,162
												636

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			-----ENGINEERING CHECKS--		-----TEMPERATURES (F)--		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating		Clg % OA	10.1	Type	Clg	Htg
(Mbh)	(cfm)	Deg F	Deg F									
Main Htg	0.0	0	0.0	0.0	Vent.	1,260	0	Clg Cfm/Sqft	0.67	SADB	58.9	0.
Aux Htg	-244.8	12,870	62.9	80.8	Infil	963	0	Clg Cfm/Ton	280.57	Plenum	75.0	0.
Preheat	-159.9	1,260	3.0	56.9	Supply	12,530	0	Clg Sqft/Ton	419.09	Return	75.0	0.
Reheat	-0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	28.63	Ret/OA	76.2	0.
Humidif	0.0	0	0.0	0.0	Return	19,769	0	No. People	112	Runarnd	75.0	0.
Opt Vent	0.0	0	0.0	0.0	Exhaust	1,260	0	Htg % OA	0.0	Fn MtrTD	0.7	0.
Total	-404.7				Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.5	0.
					Auxil	0	12,870	Htg Btuh/SqFt	-8.54	Fn Frict	1.5	0.

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
Peaked at Time ==> Mo/Hr: 9/15 \* Mo/Hr: 9/15 \* Mo/Hr: 0/0  
Outside Air ==> OADB/WB/HR: 83/ 70/ 94.8 \* OADB: 83 \* OADB: 0

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of To
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Roof Cond	1,261	0		1,261	1.74	*	1,261	1.86	*	0	0	0.0
Glass Solar	10,440	0		10,440	14.41	*	10,440	15.39	*	0	0	0.0
Glass Cond	507	0		507	0.70	*	507	0.75	*	0	0	0.0
Wall Cond	564	0		564	0.78	*	564	0.83	*	0	0	0.0
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.0
Infiltration	1,803			1,803	2.49	*	670	0.99	*	0	0	0.0
Sub Total==>	14,575	0		14,575	20.11	*	13,441	19.82	*	0	0	0.0
Internal Loads												
Lights	3,893	0		3,893	5.37	*	3,893	5.74	*	0	0	0.0
People	2,922			2,922	4.03	*	1,392	2.05	*	0	0	0.0
Misc	49,093	0	0	49,093	67.74	*	49,093	72.39	*	0	0	0.0
Sub Total==>	55,908	0	0	55,908	77.14	*	54,378	80.18	*	0	0	0.0
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.0
Sup. Fan Heat				1,991	2.75	*		0.00	*		0	0.0
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.0
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.0
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.0
Grand Total==>	70,484	0	0	72,475	100.00	*	67,820	100.00	*	0	0	0.0

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains			
Main Clg	10.2	122.6	118.1	5,600	75.1	63.4	73.2	63.4	56.2	59.3	Floor	861
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	501
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	62
Totals	10.2	122.6									Roof	861
											Wall	868
												120
												1

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			-----ENGINEERING CHECKS-----		-----TEMPERATURES (F)-----		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating		Clg % OA		Type	Clg	Htg
(Mbh)	(cfm)	Deg F	Deg F									
Main Htg	-0.0	0	0.0	0.0	Vent	0	0	Clg Cfm/Sqft	6.50	SADB	63.6	0.
Aux Htg	0.0	0	0.0	0.0	Infil	80	0	Clg Cfm/Ton	548.12	Plenum	75.0	0.
Preheat	-376.3	5,600	0.0	63.3	Supply	5,600	0	Clg Sqft/Ton	84.27	Return	75.0	0.
Reheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	142.39	Ret/OA	75.0	0.
Humidif	0.0	0	0.0	0.0	Return	5,600	0	No. People	6	Runarnd	75.0	0.
Opt Vent	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.1	0.
Total	0.0				Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.1	0.
					Auxil	0	0	Htg Btuh/SqFt	0.00	Fn Frict	0.2	0.

System 3 Peak S2 - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==>	Mo/Hr: 7/15				*	Mo/Hr: 7/15		*	Mo/Hr: 13/ 1			
Outside Air ==>	OADB/WB/HR: 94/ 78/124.0				*	OADB: 94		*	OADB: 3			
					*			*				
	Space	Ret. Air	Ret. Air	Net	Percent	*	Space	Percent	*	Space Peak	Coil Peak	Percn
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space Sens	Tot Sens	Of To
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)
Envelope Loads						*			*			
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Roof Cond	16,756	0		16,756	6.93	*	16,756	11.47	*	-15,701	-15,701	11.2
Glass Solar	28,392	0		28,392	11.74	*	28,392	19.44	*	0	0	0.0
Glass Cond	8,047	0		8,047	3.33	*	8,047	5.51	*	-31,917	-31,917	22.7
Wall Cond	3,786	0		3,786	1.57	*	3,786	2.59	*	-17,496	-17,496	12.4
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0
Exposed Floor	0			0	0.00	*	0	0.00	*	-890	-890	0.6
Infiltration	24,790			24,790	10.25	*	8,980	6.15	*	-31,666	-31,666	22.5
Sub Total==>	81,771	0		81,771	33.82	*	65,961	45.16	*	-97,670	-97,670	69.6
Internal Loads						*			*			
Lights	52,902	0		52,902	21.88	*	52,902	36.22	*	0	0	0.0
People	51,909			51,909	21.47	*	27,209	18.63	*	0	0	0.0
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.0
Sub Total==>	104,810	0	0	104,810	43.36	*	80,111	54.84	*	0	0	0.0
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Outside Air	0	0	0	42,894	17.74	*	0	0.00	*	0	-54,792	39.0
Sup. Fan Heat				12,272	5.08	*		0.00	*		12,272	-8.7
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.0
OV/UNDR Sizing	0			0	-0.00	*	0	-0.00	*	0	0	-0.0
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.0
						*			*			
Grand Total==>	186,582	0	0	241,748	100.00	*	146,072	100.00	*	-97,670	-140,190	100.0

-----COOLING COIL SELECTION-----

-----AREAS-----

	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR	Leaving DB/WB/HR	Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F Deg F Grains	Deg F Deg F Grains	Floor		
Main Clg	30.9	371.3	267.1	76.9 64.6 76.2	55.6 47.4 38.0	7,667		
Aux Clg	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	Part	7,340	
Opt Vent	0.0	0.0	0.0	0.0 0.0 0.0	0.0 0.0 0.0	ExFlr	16	
Totals	30.9	371.3				Roof	8,081	0
						Wall	3,510	728 2

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	10.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	770	770	Clg Cfm/Sqft	1.00	SADB	57.1	82.
Main Htg	-319.2	7,670	41.3	80.5	Infil	445	445	Clg Cfm/Ton	247.89	Plenum	75.0	70.
Aux Htg	0.0	0	0.0	0.0	Supply	7,670	7,670	Clg Sqft/Ton	247.79	Return	75.0	70.
Preheat	-0.0	7,670	63.3	55.6	Mincfm	0	0	Clg Btuh/Sqft	48.43	Ret/OA	76.9	63.
Reheat	0.0	0	0.0	0.0	Return	7,670	7,670	No. People	130	Runarnd	75.0	70.
Humidif	0.0	0	0.0	0.0	Exhaust	770	770	Htg % OA	10.0	Fn MtrTD	0.5	0.
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	1.00	Fn BldTD	0.4	0.
Total	-319.2				Auxil	0	0	Htg Btuh/SqFt	-41.63	Fn Frict	1.1	0.

System 4 Block VAVFSK - VAV WITH FORCED FLO SKIN

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==>	Mo/Hr: 7/15				*	Mo/Hr: 9/15				*	Mo/Hr: 0/ 0			
Outside Air ==>	OADB/WB/HR: 94/ 78/124.0				*	OADB: 83				*	OADB: 0			
					*					*				
	Space	Ret. Air	Ret. Air	Net	Perct	*	Space	Perct	*	Space Peak	Coil Peak	Perct		
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space Sens	Tot Sens	Of To		
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)		
Envelope Loads						*			*					
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0		
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0		
Roof Cond	29,417	0		29,417	8.65	*	20,777	10.98	*	0	0	0.0		
Glass Solar	32,296	0		32,296	9.50	*	57,082	30.18	*	0	0	0.0		
Glass Cond	8,302	0		8,302	2.44	*	3,172	1.68	*	0	0	0.0		
Wall Cond	7,396	0		7,396	2.17	*	5,224	2.76	*	0	0	0.0		
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0		
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.0		
Infiltration	38,183			38,183	11.23	*	5,557	2.94	*	0	0	0.0		
Sub Total==>	115,594	0		115,594	33.99	*	91,811	48.54	*	0	0	0.0		
Internal Loads						*			*					
Lights	48,465	0		48,465	14.25	*	48,465	25.62	*	0	0	0.0		
People	53,905			53,905	15.85	*	28,256	14.94	*	0	0	0.0		
Misc	20,632	0	0	20,632	6.07	*	20,632	10.91	*	0	0	0.0		
Sub Total==>	123,002	0	0	123,002	36.16	*	97,352	51.46	*	0	0	0.0		
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.0		
Outside Air	0	0	0	73,030	21.47	*	0	0.00	*	0	0	0.0		
Sup. Fan Heat				28,489	8.38	*		0.00	*		0	0.0		
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0		
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.0		
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.0		
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0		
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.0		
						*			*					
Grand Total==>	238,596	0	0	340,115	100.00	*	189,163	100.00	*	0	0	0.0		

-----COOLING COIL SELECTION-----										-----AREAS-----		
Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)	
(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	14,142		
Main Clg	45.0	539.9	384.6	10,683	77.3	64.5	74.8	55.9	Part	9,258		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	ExFlr	219		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	Roof	14,187	0	
Totals	45.0	539.9							Wall	5,706	751	1

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			-----ENGINEERING CHECKS-----		-----TEMPERATURES (F)-----		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	11.8	Type	Clg	Htg	
(Mbh)	(cfm)	Deg F	Deg F	Vent	1,270	0	Clg Cfm/Sqft	0.76	SADB	58.4	0.	
Main Htg	0.0	0	0.0	Infil	664	0	Clg Cfm/Ton	238.71	Plenum	75.0	0.	
Aux Htg	-275.7	3,240	20.0	Supply	10,740	0	Clg Sqft/Ton	314.32	Return	75.0	0.	
Preheat	-317.3	1,270	3.0	Mincfm	0	0	Clg Btuh/Sqft	38.18	Ret/OA	77.3	0.	
Reheat	-0.0	0	0.0	Return	10,740	0	No. People	135	Runarnd	75.0	0.	
Humidif	0.0	0	0.0	Exhaust	1,270	0	Htg % OA	0.0	Fn MtrTD	0.8	0.	
Opt Vent	0.0	0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn BldTD	0.6	0.	
Total	-593.0			Auxil	0	3,240	Htg Btuh/SqFt	-22.44	Fn Frict	1.9	0.	

System 5 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 3

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of To
Envelope Loads	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	-22,251	12.9
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Glass Cond	0	0		0	0.00	*	0	0.00	*	-2,386	-2,386	1.3
Wall Cond	0	0		0	0.00	*	0	0.00	*	-37,662	-41,484	24.1
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0
Exposed Floor	0			0	0.00	*	0	0.00	*	-11,066	-11,066	6.4
Infiltration	0			0	0.00	*	0	0.00	*	-47,107	-47,107	27.4
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-98,222	-124,294	72.4
Internal Loads						*			*			
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.0
People	0			0	0.00	*	0	0.00	*	0	0	0.0
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.0
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	-26,073	0	0.0
Ceiling Load	0			0	0.00	*	0	0.00	*	0	-54,792	31.9
Outside Air	0	0	0	0	0.00	*	0	0.00	*		7,402	-4.3
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.0
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.0
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	-0.0
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.0
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-124,294	-171,685	100.0

-----COOLING COIL SELECTION-----										-----AREAS-----		
Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)	
(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	12,680	
Main Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	5,875	
Aux Clg	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	199	
Opt Vent	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	12,680	0
Totals	0.0	0.0								Wall	5,442	54

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)--		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	770	Clg Cfm/Sqft	0.00	SADB	0.0	85.
Main Htg	-397.2	7,710	35.8	84.3	Infil	0	662	Clg Cfm/Ton	0.00	Plenum	0.0	63.
Aux Htg	0.0	0	0.0	0.0	Supply	0	7,710	Clg Sqft/Ton	0.00	Return	0.0	70.
Preheat	-0.0	7,710	63.3	-0.9	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	63.
Reheat	0.0	0	0.0	0.0	Return	0	7,710	No. People	0	Runarnd	0.0	70.
Humidif	0.0	0	0.0	0.0	Exhaust	0	770	Htg % OA	10.0	Fn MtrTD	0.3	0.
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.61	Fn BldTD	0.2	0.
Total	-397.2				Auxil	0	0	Htg Btuh/SqFt	-31.32	Fn Frict	0.7	0.

System 6 Block VAVFSK - VAV WITH FORCED FLO SKIN

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/15 \* Mo/Hr: 7/15 \* Mo/Hr: 0/0  
Outside Air ==> OADB/WB/HR: 94/ 78/124.0 \* OADB: 94 \* OADB: 0

	Space	Ret. Air	Ret. Air	Net	Percnt		Space	Percnt		Space Peak	Coil Peak	Percn
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of To
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Roof Cond	20,501	0		20,501	13.10	*	20,501	22.51	*	0	0	0.0
Glass Solar	1,326	0		1,326	0.85	*	1,326	1.46	*	0	0	0.0
Glass Cond	666	0		666	0.43	*	666	0.73	*	0	0	0.0
Wall Cond	3,929	0		3,929	2.51	*	3,929	4.31	*	0	0	0.0
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0
Exposed Floor	0			0	0.00	*	0	0.00	*	0	0	0.0
Infiltration	15,929			15,929	10.18	*	5,590	6.14	*	0	0	0.0
Sub Total==>	42,351	0		42,351	27.07	*	32,012	35.15	*	0	0	0.0
Internal Loads												
Lights	42,376	0		42,376	27.08	*	42,376	46.53	*	0	0	0.0
People	9,175			9,175	5.86	*	4,300	4.72	*	0	0	0.0
Misc	12,378	0	0	12,378	7.91	*	12,378	13.59	*	0	0	0.0
Sub Total==>	63,929	0	0	63,929	40.86	*	59,054	64.85	*	0	0	0.0
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Outside Air	0	0	0	40,253	25.73	*	0	0.00	*	0	0	0.0
Sup. Fan Heat				9,930	6.35	*		0.00	*		0	0.0
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.0
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.0
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.0
Grand Total==>	106,279	0	0	156,462	100.00	*	91,066	100.00	*	0	0	0.0

-----COOLING COIL SELECTION-----											-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR				Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains				
Main Clg	21.8	261.8	192.6	5,032	77.6	64.8	75.9	56.1	46.1	32.7	Floor	13,222	
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	7,668	
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	132	
Totals	21.8	261.8									Roof	9,887	0
											Wall	2,226	60

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			-----ENGINEERING CHECKS--		-----TEMPERATURES (F)--		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA		Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent				13.9			
Main Htg	0.0	0	0.0	0.0	Infil	700	0	Clg Cfm/Sqft	0.38	SADB	58.0	0.
Aux Htg	-111.3	1,980	38.1	91.0	Supply	5,032	0	Clg Cfm/Ton	230.65	Plenum	75.0	0.
Preheat	-183.6	700	3.0	56.1	Mincfm	0	0	Clg Sqft/Ton	606.05	Return	75.0	0.
Reheat	-0.0	0	0.0	0.0	Return	5,032	0	No. People	15	Ret/OA	77.6	0.
Humidif	0.0	0	0.0	0.0	Exhaust	700	0	Htg % OA	0.0	Rn rnd	75.0	0.
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	0.00	Fn MtrTD	0.6	0.
Total	-294.9				Auxil	0	1,980	Htg Btuh/SqFt	-13.89	Fn BldTD	0.5	0.
										Fn Frict	1.4	0.

System 7 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/18 \* Mo/Hr: 13/ 1  
Outside Air ==> OADB/WB/HR: 93/ 77/124.1 \* OADB: 89 \* OADB: 3

	Space	Ret. Air	Ret. Air	Net	Perct		Space	Perct		Space Peak	Coil Peak	Perct
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of To
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.0
Roof Cond	17,412	0		17,412	9.27	*	16,003	19.62	*	-15,472	-15,472	5.3
Glass Solar	9,098	0		9,098	4.85	*	8,702	10.67	*	0	0	0.0
Glass Cond	4,471	0		4,471	2.38	*	3,930	4.82	*	-17,342	-17,342	5.9
Wall Cond	10,713	0		10,713	5.71	*	13,870	17.00	*	-37,777	-37,777	12.9
Partition	0			0	0.00	*	0	0.00	*	0	0	0.0
Exposed Floor	0			0	0.00	*	0	0.00	*	-12,902	-12,902	4.4
Infiltration	27,574			27,574	14.69	*	11,219	13.75	*	-52,658	-52,658	18.1
Sub Total==>	69,268	0		69,268	36.89	*	53,725	65.87	*	-136,150	-136,150	46.8
Internal Loads												
Lights	6,881	0		6,881	3.66	*	7,741	9.49	*	0	0	0.0
People	1,680			1,680	0.89	*	10,395	12.74	*	0	0	0.0
Misc	4,134	0	0	4,134	2.20	*	9,340	11.45	*	0	0	0.0
Sub Total==>	12,695	0	0	12,695	6.76	*	27,476	33.69	*	0	0	0.0
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	-170,781	58.7
Outside Air	0	0	0	89,430	47.63	*	0	0.00	*	0	16,000	-5.5
Sup. Fan Heat				16,000	8.52	*		0.00	*		0	0.0
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.0
Duct Heat PkUp		0		0	0.00	*		0.00	*		0	0.0
OV/UNDR Sizing	366			366	0.19	*	366	0.45	*	0	0	-0.0
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.0
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.0
Grand Total==>	82,328	0	0	187,758	100.00	*	81,567	100.00	*	-136,150	-290,931	100.0

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Gross (sf)	(%)
	(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor		
Main Clg	46.9	562.6	392.0	12,000	78.7	70.1	102.8	67.3	55.8	51.4	Part	9,162
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	232
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	7,963
Totals	46.9	562.6									Wall	6,222
												396

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----					-----ENGINEERING CHECKS-----			-----TEMPERATURES (F)-----		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg	% OA				Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F				Clg Cfm/Sqft							
Main Htg	-438.8	12,000	45.0	79.4	Vent	2,400	2,400	1.60					SADB	68.6	80.
Aux Htg	0.0	0	0.0	0.0	Infil	740	740	255.95					Plenum	75.0	70.
Preheat	-136.9	12,000	56.6	67.3	Supply	12,000	12,000	159.99					Return	75.0	70.
Reheat	0.0	0	0.0	0.0	Minclm	0	0	75.00					Ret/OA	78.7	56.
Humidif	0.0	0	0.0	0.0	Return	12,000	12,000	75					Runarnd	75.0	70.
Opt Vent	0.0	0	0.0	0.0	Exhaust	2,400	2,400	20.0					Fn MtrTD	0.4	0.
Total	-438.8				Rm Exh	0	0	1.60					Fn BldTD	0.3	0.
					Auxil	0	0	-58.50					Fn Frict	0.9	0.

MAIN SYSTEM COOLING - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- P E A K C O O L I N G L O A D S -----  
(Main System)

		Space							Coil								
Room Number	Description	Peak	OA	Rm	Supp.	Space	Space	Space	Peak	OA	Rm	Supp.	Coil	Coil	Coil		
		Time	Cond.	Dry	Dry	Air	Sens.	Lat.	Time	Cond.	Dry	Dry	Air	Sens.	Lat.		
		Mo/Hr	DB/WB	Blb	Bulb	Flow	Load	Load	Mo/Hr	DB/WB	Blb	Bulb	Flow	Load	Load		
			(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		
1	ADMIN OFFICES	7/15	94	78	75	58.9	12,530	213,804	58,344	7/15	94	78	75	58.9	19,769	404,927	105,373
Zone	1 Total/Ave.		94	78	75	58.9	12,530	213,804	58,344		94	78	75	58.9	19,769	404,927	105,373
Zone	1 Block	7/15	94	78	75	58.9	12,530	213,804	58,344	7/15	94	78	75	58.9	19,769	404,927	105,373
System	1 Total/Ave.		94	78	75	58.9	12,530	213,804	58,344		94	78	75	58.9	19,769	404,927	105,373
System	1 Block	7/15	94	78	75	58.9	12,530	213,804	58,344	7/15	94	78	75	58.9	19,769	404,927	105,373
2	COMPUTER ROOM	9/15	83	70	75	63.6	5,600	67,820	2,664	9/15	83	70	75	63.6	5,600	69,811	2,664
Zone	2 Total/Ave.		83	70	75	63.6	5,600	67,820	2,664		83	70	75	63.6	5,600	69,811	2,664
Zone	2 Block	9/15	83	70	75	63.6	5,600	67,820	2,664	9/15	83	70	75	63.6	5,600	69,811	2,664
System	2 Total/Ave.		83	70	75	63.6	5,600	67,820	2,664		83	70	75	63.6	5,600	69,811	2,664
System	2 Block	9/15	83	70	75	63.6	5,600	67,820	2,664	9/15	83	70	75	63.6	5,600	69,811	2,664
3	ASSEMBLY HALL	7/15	94	78	75	57.1	7,670	146,072	40,510	7/15	94	78	75	57.1	7,670	173,882	67,866
Zone	3 Total/Ave.		94	78	75	57.1	7,670	146,072	40,510		94	78	75	57.1	7,670	173,882	67,866
Zone	3 Block	7/15	94	78	75	57.1	7,670	146,072	40,510	7/15	94	78	75	57.1	7,670	173,882	67,866
System	3 Total/Ave.		94	78	75	57.1	7,670	146,072	40,510		94	78	75	57.1	7,670	173,882	67,866
System	3 Block	7/15	94	78	75	57.1	7,670	146,072	40,510	7/15	94	78	75	57.1	7,670	173,882	67,866
4	MEDICAL CLINIC	9/15	83	70	75	58.4	12,690	223,505	37,446	7/15	94	78	75	58.4	10,683	242,279	97,836
Zone	4 Total/Ave.		83	70	75	58.4	12,690	223,505	37,446		94	78	75	58.4	10,683	242,279	97,836
Zone	4 Block	9/15	83	70	75	58.4	12,690	223,505	37,446	7/15	94	78	75	58.4	10,683	242,279	97,836
System	4 Total/Ave.		83	70	75	58.4	12,690	223,505	37,446		94	78	75	58.4	10,683	242,279	97,836
System	4 Block	9/15	83	70	75	58.4	10,740	189,163	37,446	7/15	94	78	75	58.4	10,683	242,279	97,836
5	OFFICES-STORE	7/15	94	78	75	58.0	7,010	126,861	15,214	7/15	94	78	75	58.0	5,032	115,121	41,341
Zone	6 Total/Ave.		94	78	75	58.0	7,010	126,861	15,214		94	78	75	58.0	5,032	115,121	41,341
Zone	6 Block	7/15	94	78	75	58.0	7,010	126,861	15,214	7/15	94	78	75	58.0	5,032	115,121	41,341
System	6 Total/Ave.		94	78	75	58.0	7,010	126,861	15,214		94	78	75	58.0	5,032	115,121	41,341
System	6 Block	7/15	94	78	75	58.0	5,032	91,066	15,214	7/15	94	78	75	58.0	5,032	115,121	41,341
7	CHAPEL-AUDTRM	7/18	89	75	75	68.6	12,000	81,567	19,931	7/16	93	77	75	69.7	12,000	130,816	56,942
Zone	7 Total/Ave.		89	75	75	68.6	12,000	81,567	19,931		93	77	75	69.7	12,000	130,816	56,942
Zone	7 Block	7/18	89	75	75	68.6	12,000	81,567	19,931	7/16	93	77	75	69.7	12,000	130,816	56,942
System	7 Total/Ave.		89	75	75	68.6	12,000	81,567	19,931		93	77	75	69.7	12,000	130,816	56,942
System	7 Block	7/18	89	75	75	68.6	12,000	81,567	19,931	7/16	93	77	75	69.7	12,000	130,816	56,942



MAIN SYSTEM HEATING - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- P E A K H E A T I N G L O A D S -----  
(Main System)

Room Number	Description	Floor Area (Sq Ft)	Space					Coil					Coil Air Flow (Cfm)	Coil Sens. Load (Btuh)		
			Peak	OA	Rm	Supp.	Space	Space	Peak	OA	Rm	Supp.				
			Time Mo/Hr	Cond. DB/WB (F)	Dry B1b (F)	Dry Bulb (F)	Air Flow (Cfm)	Sens. Load (Btuh)	Time Mo/Hr	Cond. DB/WB (F)	Dry B1b (F)	Dry Bulb (F)				
3	ASSEMBLY HALL	7,667	13/ 1	3	1	70	82.0	7,670	-97,670	13/ 1	3	1	70	82.0	7,670	-140,190
Zone	3 Total/Ave.	7,667		3	1	70	82.0	7,670	-97,670		3	1	70	82.0	7,670	-140,190
Zone	3 Block	7,667	13/ 1	3	1	70	82.0	7,670	-97,670	13/ 1	3	1	70	82.0	7,670	-140,190
System	3 Total/Ave.	7,667		3	1	70	82.0	7,670	-97,670		3	1	70	82.0	7,670	-140,190
System	3 Block	7,667	13/ 1	3	1	70	82.0	7,670	-97,670	13/ 1	3	1	70	82.0	7,670	-140,190
5	CLOTHING ISSUE	12,680	13/ 1	3	1	70	85.2	7,710	-124,294	13/ 1	3	1	70	85.2	7,710	-171,685
Zone	5 Total/Ave.	12,680		3	1	70	85.2	7,710	-124,294		3	1	70	85.2	7,710	-171,685
Zone	5 Block	12,680	13/ 1	3	1	70	85.2	7,710	-124,294	13/ 1	3	1	70	85.2	7,710	-171,685
System	5 Total/Ave.	12,680		3	1	70	85.2	7,710	-124,294		3	1	70	85.2	7,710	-171,685
System	5 Block	12,680	13/ 1	3	1	70	85.2	7,710	-124,294	13/ 1	3	1	70	85.2	7,710	-171,685
7	CHAPEL-AUDTRM	7,501	13/ 1	3	1	70	80.7	12,000	-136,150	13/ 1	3	1	70	80.7	12,000	-290,931
Zone	7 Total/Ave.	7,501		3	1	70	80.7	12,000	-136,150		3	1	70	80.7	12,000	-290,931
Zone	7 Block	7,501	13/ 1	3	1	70	80.7	12,000	-136,150	13/ 1	3	1	70	80.7	12,000	-290,931
System	7 Total/Ave.	7,501		3	1	70	80.7	12,000	-136,150		3	1	70	80.7	12,000	-290,931
System	7 Block	7,501	13/ 1	3	1	70	80.7	12,000	-136,150	13/ 1	3	1	70	80.7	12,000	-290,931

AUXILIARY SYSTEM HEATING - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

PEAK HEATING LOADS  
(Auxiliary System)

Room Number Description	Floor Area (Sq Ft)	Peak Time Mo/Hr	OA Cond. DB/WB	Rm Dry Blb	Supp. Dry Bulb	Space Air Flow	Space Sens. Load	Peak Time Mo/Hr	OA Cond. DB/WB	Rm Dry Blb	Supp. Dry Bulb	Coil Air Flow	Coil Sens. Load
1 ADMIN OFFICES	18,716	13/ 1	3	1	70	80.8	12,870	13/ 1	3	1	70	80.8	12,870
Zone 1 Total/Ave.	18,716		3	1	70	80.8	12,870		3	1	70	80.8	12,870
Zone 1 Block	18,716	13/ 1	3	1	70	80.8	12,870	13/ 1	3	1	70	80.8	12,870
System 1 Total/Ave.	18,716		3	1	70	80.8	12,870		3	1	70	80.8	12,870
System 1 Block	18,716	13/ 1	3	1	70	80.8	12,870	13/ 1	3	1	70	80.8	12,870
4 MEDICAL CLINIC	14,142	13/ 1	3	1	70	100.1	3,240	13/ 1	3	1	70	100.1	3,240
Zone 4 Total/Ave.	14,142		3	1	70	100.1	3,240		3	1	70	100.1	3,240
Zone 4 Block	14,142	13/ 1	3	1	70	100.1	3,240	13/ 1	3	1	70	100.1	3,240
System 4 Total/Ave.	14,142		3	1	70	100.1	3,240		3	1	70	100.1	3,240
System 4 Block	14,142	13/ 1	3	1	70	100.1	3,240	13/ 1	3	1	70	100.1	3,240
6 OFFICES-STORE	13,222	13/ 1	3	1	70	91.0	1,980	13/ 1	3	1	70	91.0	1,980
Zone 6 Total/Ave.	13,222		3	1	70	91.0	1,980		3	1	70	91.0	1,980
Zone 6 Block	13,222	13/ 1	3	1	70	91.0	1,980	13/ 1	3	1	70	91.0	1,980
System 6 Total/Ave.	13,222		3	1	70	91.0	1,980		3	1	70	91.0	1,980
System 6 Block	13,222	13/ 1	3	1	70	91.0	1,980	13/ 1	3	1	70	91.0	1,980

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- INTERNAL COOLING LOADS -----  
(At time of Coil Peak)

Room Number	Description	Lights Room		Lights Ret. Air Lites		People		People		Misc. Space		Misc. Space		Misc. Ret. Air Misc.		Total
		Sensible (Btuh)	CLF	Sensible (Btuh)	CLF	Sensible (Btuh)	CLF	Latent (Btuh)	CLF	Sensible (Btuh)	CLF	Latent (Btuh)	CLF	Sensible (Btuh)	CLF	
1	ADMIN OFFICES	81,309	0 0.970	25,480	0.950	22,400	0.950	130,052		0		0		0 1.000		259,241
Zone	1 Total/Ave.	81,309	0 0.970	25,480	0.950	22,400	0.950	130,052		0		0		0 1.000		259,241
Zone	1 Block	81,309	0 0.970	25,480	0.950	22,400	0.950	130,052		0		0		0 1.000		259,241
System	1 Total/Ave.	81,309	0 0.970	25,480	0.950	22,400	0.950	130,052		0		0		0 1.000		259,241
System	1 Block	81,309	0 0.970	25,480	0.950	22,400	0.950	130,052		0		0		0 1.000		259,241
2	COMPUTER ROOM	3,893	0 0.970	1,392	0.955	1,530	0.955	49,093		0		0		0 1.000		55,908
Zone	2 Total/Ave.	3,893	0 0.970	1,392	0.955	1,530	0.955	49,093		0		0		0 1.000		55,908
Zone	2 Block	3,893	0 0.970	1,392	0.955	1,530	0.955	49,093		0		0		0 1.000		55,908
System	2 Total/Ave.	3,893	0 0.970	1,392	0.955	1,530	0.955	49,093		0		0		0 1.000		55,908
System	2 Block	3,893	0 0.970	1,392	0.955	1,530	0.955	49,093		0		0		0 1.000		55,908
3	ASSEMBLY HALL	52,902	0 1.000	27,209	0.951	24,700	0.951	0		0		0		0 0.000		104,810
Zone	3 Total/Ave.	52,902	0 1.000	27,209	0.951	24,700	0.951	0		0		0		0 0.000		104,810
Zone	3 Block	52,902	0 1.000	27,209	0.951	24,700	0.951	0		0		0		0 0.000		104,810
System	3 Total/Ave.	52,902	0 1.000	27,209	0.951	24,700	0.951	0		0		0		0 0.000		104,810
System	3 Block	52,902	0 1.000	27,209	0.951	24,700	0.951	0		0		0		0 0.000		104,810
4	MEDICAL CLINIC	48,465	0 1.000	28,256	0.951	25,650	0.951	20,632		0		0		0 0.790		123,002
Zone	4 Total/Ave.	48,465	0 1.000	28,256	0.951	25,650	0.951	20,632		0		0		0 0.790		123,002
Zone	4 Block	48,465	0 1.000	28,256	0.951	25,650	0.951	20,632		0		0		0 0.790		123,002
System	4 Total/Ave.	48,465	0 1.000	28,256	0.951	25,650	0.951	20,632		0		0		0 0.790		123,002
System	4 Block	48,465	0 1.000	28,256	0.951	25,650	0.951	20,632		0		0		0 0.790		123,002
5	OFFICES-STORE	42,376	0 0.970	4,300	0.956	4,875	0.956	12,378		0		0		0 0.850		63,929
Zone	6 Total/Ave.	42,376	0 0.970	4,300	0.956	4,875	0.956	12,378		0		0		0 0.850		63,929
Zone	6 Block	42,376	0 0.970	4,300	0.956	4,875	0.956	12,378		0		0		0 0.850		63,929
System	6 Total/Ave.	42,376	0 0.970	4,300	0.956	4,875	0.956	12,378		0		0		0 0.850		63,929
System	6 Block	42,376	0 0.970	4,300	0.956	4,875	0.956	12,378		0		0		0 0.850		63,929
7	CHAPEL-AUDTRM	6,881	0 0.160	630	0.064	1,050	0.064	4,134		0		0		0 0.270		12,695
Zone	7 Total/Ave.	6,881	0 0.160	630	0.064	1,050	0.064	4,134		0		0		0 0.270		12,695
Zone	7 Block	6,881	0 0.160	630	0.064	1,050	0.064	4,134		0		0		0 0.270		12,695
System	7 Total/Ave.	6,881	0 0.160	630	0.064	1,050	0.064	4,134		0		0		0 0.270		12,695
System	7 Block	6,881	0 0.160	630	0.064	1,050	0.064	4,134		0		0		0 0.270		12,695

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- INTERNAL COOLING LOADS -----  
(At time of Space Peak)

Room Number	Description	Lights		People		Misc. Space Sensible (Btuh)	Misc. Space Latent (Btuh)	Misc.		Total (Btuh)
		Room Sensible (Btuh)	Ret. Air Lites Sensible CLF (Btuh)	People Sensible (Btuh)	People Latent CLF (Btuh)			Ret. Air Sensible (Btuh)	Misc. CLF (Btuh)	
1	ADMIN OFFICES	81,309	0 0.970	25,480	22,400 0.950	130,052	0	0 1.000		259,241
Zone	1 Total/Ave.	81,309	0 0.970	25,480	22,400 0.950	130,052	0	0 1.000		259,241
Zone	1 Block	81,309	0 0.970	25,480	22,400 0.950	130,052	0	0 1.000		259,241
System	1 Total/Ave.	81,309	0 0.970	25,480	22,400 0.950	130,052	0	0 1.000		259,241
System	1 Block	81,309	0 0.970	25,480	22,400 0.950	130,052	0	0 1.000		259,241
2	COMPUTER ROOM	3,893	0 0.970	1,392	1,530 0.955	49,093	0	0 1.000		55,908
Zone	2 Total/Ave.	3,893	0 0.970	1,392	1,530 0.955	49,093	0	0 1.000		55,908
Zone	2 Block	3,893	0 0.970	1,392	1,530 0.955	49,093	0	0 1.000		55,908
System	2 Total/Ave.	3,893	0 0.970	1,392	1,530 0.955	49,093	0	0 1.000		55,908
System	2 Block	3,893	0 0.970	1,392	1,530 0.955	49,093	0	0 1.000		55,908
3	ASSEMBLY HALL	52,902	0 1.000	27,209	24,700 0.951	0	0	0 0.000		104,810
Zone	3 Total/Ave.	52,902	0 1.000	27,209	24,700 0.951	0	0	0 0.000		104,810
Zone	3 Block	52,902	0 1.000	27,209	24,700 0.951	0	0	0 0.000		104,810
System	3 Total/Ave.	52,902	0 1.000	27,209	24,700 0.951	0	0	0 0.000		104,810
System	3 Block	52,902	0 1.000	27,209	24,700 0.951	0	0	0 0.000		104,810
4	MEDICAL CLINIC	48,465	0 1.000	28,256	25,650 0.951	20,632	0	0 0.790		123,002
Zone	4 Total/Ave.	48,465	0 1.000	28,256	25,650 0.951	20,632	0	0 0.790		123,002
Zone	4 Block	48,465	0 1.000	28,256	25,650 0.951	20,632	0	0 0.790		123,002
System	4 Total/Ave.	48,465	0 1.000	28,256	25,650 0.951	20,632	0	0 0.790		123,002
System	4 Block	48,465	0 1.000	28,256	25,650 0.951	20,632	0	0 0.790		123,002
6	OFFICES-STORE	42,376	0 0.970	4,300	4,875 0.956	12,378	0	0 0.850		63,929
Zone	6 Total/Ave.	42,376	0 0.970	4,300	4,875 0.956	12,378	0	0 0.850		63,929
Zone	6 Block	42,376	0 0.970	4,300	4,875 0.956	12,378	0	0 0.850		63,929
System	6 Total/Ave.	42,376	0 0.970	4,300	4,875 0.956	12,378	0	0 0.850		63,929
System	6 Block	42,376	0 0.970	4,300	4,875 0.956	12,378	0	0 0.850		63,929
7	CHAPEL-AUDIRM	7,741	0 0.180	10,395	10,500 0.796	9,340	0	0 0.610		37,976
Zone	7 Total/Ave.	7,741	0 0.180	10,395	10,500 0.796	9,340	0	0 0.610		37,976
Zone	7 Block	7,741	0 0.180	10,395	10,500 0.796	9,340	0	0 0.610		37,976
System	7 Total/Ave.	7,741	0 0.180	10,395	10,500 0.796	9,340	0	0 0.610		37,976
System	7 Block	7,741	0 0.180	10,395	10,500 0.796	9,340	0	0 0.610		37,976

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----												
(Roof - Skylight)												
(At time of Coil Peak)												
Room Number	Description	Roof		Roof		Skylight		Skylight		Skylight		Skylt Space CLTD
		Return Air Sensible Load (Btuh)	R.A. CLTD (F)	Space Sensible Load (Btuh)	Space CLTD (F)	Return Air Solar (Btuh)	Return Air Solar (Btuh)	Skylt Solar CLF	Skylt Solar (Btuh)	Return Air Conduction Load (Btuh)	R.A. CLTD (F)	
1	ADMIN OFFICES	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	1 Total/Ave.	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	1 Block	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	1 Total/Ave.	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	1 Block	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0.0	0 0.0
2	COMPUTER ROOM	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	2 Total/Ave.	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	2 Block	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0.0	0 0.0
System	2 Total/Ave.	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0.0	0 0.0
System	2 Block	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0.0	0 0.0
3	ASSEMBLY HALL	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	3 Total/Ave.	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	3 Block	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	3 Total/Ave.	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	3 Block	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0.0	0 0.0
4	MEDICAL CLINIC	0	0.0	29,417	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	4 Total/Ave.	0	0.0	29,417	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	4 Block	0	0.0	29,417	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	4 Total/Ave.	0	0.0	29,417	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	4 Block	0	0.0	29,417	71.5	0	0	0.000	0	0.0	0.0	0 0.0
6	OFFICES-STORE	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	6 Total/Ave.	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0.0	0 0.0
Zone	6 Block	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	6 Total/Ave.	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0.0	0 0.0
System	6 Block	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0.0	0 0.0
7	CHAPEL-AUDTRM	0	0.0	17,412	75.4	0	0	0.000	0	0.0	0.0	0 0.0
Zone	7 Total/Ave.	0	0.0	17,412	75.4	0	0	0.000	0	0.0	0.0	0 0.0
Zone	7 Block	0	0.0	17,412	75.4	0	0	0.000	0	0.0	0.0	0 0.0
System	7 Total/Ave.	0	0.0	17,412	75.4	0	0	0.000	0	0.0	0.0	0 0.0
System	7 Block	0	0.0	17,412	75.4	0	0	0.000	0	0.0	0.0	0 0.0

----- BUILDING ENVELOPE COOLING LOADS -----												
(Wall - Window)												
(At time of Coil Peak)												
Room Number	Description	Wall		Wall		Glass		Glass		Glass		Glass Return Air CLTD
		Plenum Load (Btuh)	Plenum CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)	Solar CLF	Solar (Btuh)	Space Conduction (Btuh)	Space CLTD (F)	
1	ADMIN OFFICES	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0
Zone	1 Total/Ave.	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0
Zone	1 Block	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0
System	1 Total/Ave.	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0
System	1 Block	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

(Wall - Window)  
(At time of Coil Peak)

Room Number	Description	Wall Plenum Load (Btuh)	Wall Plenum CLTD (F)	Wall Space Load (Btuh)	Wall Space CLTD (F)	Glass Space Solar (Btuh)	Glass Return Air Solar (Btuh)	Glass Solar CLF	Glass Conduction (Btuh)	Glass Space CLTD (F)	Glass Return Air Conduction (Btuh)	Glass R.A. CLTD (F)
2	COMPUTER ROOM	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
Zone	2 Total/Ave.	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
Zone	2 Block	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
System	2 Total/Ave.	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
System	2 Block	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
3	ASSEMBLY HALL	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
Zone	3 Total/Ave.	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
Zone	3 Block	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
System	3 Total/Ave.	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
System	3 Block	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
4	MEDICAL CLINIC	0	0.0	7,396	16.0	32,296	0	0.570	8,302	17.8	0	0.0
Zone	4 Total/Ave.	0	0.0	7,396	16.0	32,296	0	0.570	8,302	17.8	0	0.0
Zone	4 Block	0	0.0	7,396	16.0	32,296	0	0.570	8,302	17.8	0	0.0
System	4 Total/Ave.	0	0.0	7,396	16.0	32,296	0	0.570	8,302	17.8	0	0.0
System	4 Block	0	0.0	7,396	16.0	32,296	0	0.570	8,302	17.8	0	0.0
6	OFFICES-STORE	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
Zone	6 Total/Ave.	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
Zone	6 Block	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
System	6 Total/Ave.	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
System	6 Block	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
7	CHAPEL-AUDTRM	0	0.0	10,713	19.0	9,098	0	0.750	4,471	18.2	0	0.0
Zone	7 Total/Ave.	0	0.0	10,713	19.0	9,098	0	0.750	4,471	18.2	0	0.0
Zone	7 Block	0	0.0	10,713	19.0	9,098	0	0.750	4,471	18.2	0	0.0
System	7 Total/Ave.	0	0.0	10,713	19.0	9,098	0	0.750	4,471	18.2	0	0.0
System	7 Block	0	0.0	10,713	19.0	9,098	0	0.750	4,471	18.2	0	0.0

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible (Btuh)	Exposed Floor CLTD (F)	Partition Sensible (Btuh)	Partition CLTD (F)	Infilt. Airflow (Cfm)	Infilt. Sensible (Btuh)	Infilt. Latent (Btuh)	Dry B Temp. (F)	Ceiling Sensible Load (Btuh)	Envelope Total (Btuh)
1	ADMIN OFFICES	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
Zone	1 Total/Ave.	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
Zone	1 Block	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
System	1 Total/Ave.	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
System	1 Block	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
2	COMPUTER ROOM	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
Zone	2 Total/Ave.	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
Zone	2 Block	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
System	2 Total/Ave.	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
System	2 Block	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room Number	Description	Exposed Floor	Expsd Floor	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope Total
		Sensible (Btuh)	CLTD (F)	Sensible (Btuh)	CLTD (F)	Airflow (Cfm)	Sensible (Btuh)	Latent (Btuh)	Dry B Temp. (F)	Sensible Load (Btuh)	
3	ASSEMBLY HALL	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
Zone	3 Total/Ave.	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
Zone	3 Block	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
System	3 Total/Ave.	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
System	3 Block	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
4	MEDICAL CLINIC	0	0.0	0	0.0	664	13,399	24,784	75.0	0	115,594
Zone	4 Total/Ave.	0	0.0	0	0.0	664	13,399	24,784	75.0	0	115,594
Zone	4 Block	0	0.0	0	0.0	664	13,399	24,784	75.0	0	115,594
System	4 Total/Ave.	0	0.0	0	0.0	664	13,399	24,784	75.0	0	115,594
System	4 Block	0	0.0	0	0.0	664	13,399	24,784	75.0	0	115,594
6	OFFICES-STORE	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
Zone	6 Total/Ave.	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
Zone	6 Block	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
System	6 Total/Ave.	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
System	6 Block	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
7	CHAPEL-AUDTRM	0	0.0	0	0.0	740	14,402	13,172	75.0	0	69,268
Zone	7 Total/Ave.	0	0.0	0	0.0	740	14,402	13,172	75.0	0	69,268
Zone	7 Block	0	0.0	0	0.0	740	14,402	13,172	75.0	0	69,268
System	7 Total/Ave.	0	0.0	0	0.0	740	14,402	13,172	75.0	0	69,268
System	7 Block	0	0.0	0	0.0	740	14,402	13,172	75.0	0	69,268

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

		(Roof - Skylight)											
		(At time of Space Peak)											
Room Number	Description	Roof		Roof		Skylight		Skylight		Skylight		Skylight	
		Return Air Sensible Load	Roof R.A. CLTD	Space Sensible Load	Roof Space CLTD	Return Air Solar	Skylight Solar	Skylt Solar CLF	Return Air Conduction Load	Skylt R.A. CLTD	Space Conduction Load	Skylt Space CLTD	Skylt Space CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	(F)
1	ADMIN OFFICES	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	1 Total/Ave.	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	1 Block	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0	0.0	0.0
System	1 Total/Ave.	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0	0.0	0.0
System	1 Block	0	0.0	38,808	71.5	0	0	0.000	0	0.0	0	0.0	0.0
2	COMPUTER ROOM	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	2 Total/Ave.	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	2 Block	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0	0.0	0.0
System	2 Total/Ave.	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0	0.0	0.0
System	2 Block	0	0.0	1,261	50.5	0	0	0.000	0	0.0	0	0.0	0.0
3	ASSEMBLY HALL	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	3 Total/Ave.	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	3 Block	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0	0.0	0.0
System	3 Total/Ave.	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0	0.0	0.0
System	3 Block	0	0.0	16,756	71.5	0	0	0.000	0	0.0	0	0.0	0.0
4	MEDICAL CLINIC	0	0.0	20,777	50.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	4 Total/Ave.	0	0.0	20,777	50.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	4 Block	0	0.0	20,777	50.5	0	0	0.000	0	0.0	0	0.0	0.0
System	4 Total/Ave.	0	0.0	20,777	50.5	0	0	0.000	0	0.0	0	0.0	0.0
System	4 Block	0	0.0	20,777	50.5	0	0	0.000	0	0.0	0	0.0	0.0
6	OFFICES-STORE	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	6 Total/Ave.	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0	0.0	0.0
Zone	6 Block	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0	0.0	0.0
System	6 Total/Ave.	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0	0.0	0.0
System	6 Block	0	0.0	20,501	71.5	0	0	0.000	0	0.0	0	0.0	0.0
7	CHAPEL-AUDTRM	0	0.0	16,003	69.3	0	0	0.000	0	0.0	0	0.0	0.0
Zone	7 Total/Ave.	0	0.0	16,003	69.3	0	0	0.000	0	0.0	0	0.0	0.0
Zone	7 Block	0	0.0	16,003	69.3	0	0	0.000	0	0.0	0	0.0	0.0
System	7 Total/Ave.	0	0.0	16,003	69.3	0	0	0.000	0	0.0	0	0.0	0.0
System	7 Block	0	0.0	16,003	69.3	0	0	0.000	0	0.0	0	0.0	0.0

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

		(Wall - Window)											
		(At time of Space Peak)											
Room Number	Description	Wall		Wall		Glass		Glass		Glass		Glass	
		Plenum Load	Wall CLTD	Space Load	Wall CLTD	Space Solar	Return Air Solar	Glass Solar CLF	Space Conduction Load	Glass CLTD	Return Air Conduction Load	Glass R.A. CLTD	Glass R.A. CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	(F)
1	ADMIN OFFICES	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0	0.0
Zone	1 Total/Ave.	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0	0.0
Zone	1 Block	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0	0.0
System	1 Total/Ave.	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0	0.0
System	1 Block	0	0.0	10,402	14.3	24,812	0	0.550	7,032	17.8	0	0.0	0.0



COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----  
(Wall - Window)  
(At time of Space Peak)

Room Number	Description	Wall Plenum Load (Btuh)	Wall Plenum CLTD (F)	Wall Space Load (Btuh)	Wall Space CLTD (F)	Glass Space Solar (Btuh)	Glass Return Air Solar (Btuh)	Glass Solar CLF	Glass Space Conduction (Btuh)	Glass Space CLTD (F)	Glass Return Air Conduction (Btuh)	Glass R.A. CLTD (F)
2	COMPUTER ROOM	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
Zone	2 Total/Ave.	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
Zone	2 Block	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
System	2 Total/Ave.	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
System	2 Block	0	0.0	564	8.2	10,440	0	0.790	507	6.8	0	0.0
3	ASSEMBLY HALL	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
Zone	3 Total/Ave.	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
Zone	3 Block	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
System	3 Total/Ave.	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
System	3 Block	0	0.0	3,786	14.5	28,392	0	0.580	8,047	17.8	0	0.0
4	MEDICAL CLINIC	0	0.0	5,224	11.3	57,082	0	0.690	3,172	6.8	0	0.0
Zone	4 Total/Ave.	0	0.0	5,224	11.3	57,082	0	0.690	3,172	6.8	0	0.0
Zone	4 Block	0	0.0	5,224	11.3	57,082	0	0.690	3,172	6.8	0	0.0
System	4 Total/Ave.	0	0.0	5,224	11.3	57,082	0	0.690	3,172	6.8	0	0.0
System	4 Block	0	0.0	5,224	11.3	57,082	0	0.690	3,172	6.8	0	0.0
6	OFFICES-STORE	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
Zone	6 Total/Ave.	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
Zone	6 Block	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
System	6 Total/Ave.	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
System	6 Block	0	0.0	3,929	17.5	1,326	0	0.640	666	17.8	0	0.0
7	CHAPEL-AUDTRM	0	0.0	13,870	24.6	8,702	0	0.720	3,930	16.0	0	0.0
Zone	7 Total/Ave.	0	0.0	13,870	24.6	8,702	0	0.720	3,930	16.0	0	0.0
Zone	7 Block	0	0.0	13,870	24.6	8,702	0	0.720	3,930	16.0	0	0.0
System	7 Total/Ave.	0	0.0	13,870	24.6	8,702	0	0.720	3,930	16.0	0	0.0
System	7 Block	0	0.0	13,870	24.6	8,702	0	0.720	3,930	16.0	0	0.0

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible (Btuh)	Expsd Floor CLTD (F)	Partition Sensible (Btuh)	Part. CLTD (F)	Infilt. Airflow (Cfm)	Infilt. Sensible (Btuh)	Infilt. Latent (Btuh)	Plenum Dry B Temp. (F)	Ceiling Sensible Load (Btuh)	Envelope Total (Btuh)
1	ADMIN OFFICES	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
Zone	1 Total/Ave.	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
Zone	1 Block	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
System	1 Total/Ave.	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
System	1 Block	0	0.0	0	0.0	963	19,433	35,944	75.0	0	136,430
2	COMPUTER ROOM	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
Zone	2 Total/Ave.	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
Zone	2 Block	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
System	2 Total/Ave.	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575
System	2 Block	0	0.0	0	0.0	80	670	1,134	75.0	0	14,575

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)

(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
3	ASSEMBLY HALL	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
Zone	3 Total/Ave.	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
Zone	3 Block	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
System	3 Total/Ave.	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
System	3 Block	0	0.0	0	0.0	445	8,980	15,810	75.0	0	81,771
4	MEDICAL CLINIC	0	0.0	0	0.0	664	5,557	11,796	75.0	0	103,608
Zone	4 Total/Ave.	0	0.0	0	0.0	664	5,557	11,796	75.0	0	103,608
Zone	4 Block	0	0.0	0	0.0	664	5,557	11,796	75.0	0	103,608
System	4 Total/Ave.	0	0.0	0	0.0	664	5,557	11,796	75.0	0	103,608
System	4 Block	0	0.0	0	0.0	664	5,557	11,796	75.0	0	103,608
6	OFFICES-STORE	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
Zone	6 Total/Ave.	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
Zone	6 Block	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
System	6 Total/Ave.	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
System	6 Block	0	0.0	0	0.0	277	5,590	10,339	75.0	0	42,351
7	CHAPEL-AUDTRM	0	0.0	0	0.0	740	11,219	9,431	75.0	0	63,156
Zone	7 Total/Ave.	0	0.0	0	0.0	740	11,219	9,431	75.0	0	63,156
Zone	7 Block	0	0.0	0	0.0	740	11,219	9,431	75.0	0	63,156
System	7 Total/Ave.	0	0.0	0	0.0	740	11,219	9,431	75.0	0	63,156
System	7 Block	0	0.0	0	0.0	740	11,219	9,431	75.0	0	63,156

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Roof - Skylight)  
(At time of Coil Peak)

----- BUILDING ENVELOPE HEATING LOADS -----  
(Wall - Window)  
(At time of Coil Peak)

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room		Exposed	Expad	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenm	Ceiling	Envelope
Number	Description	Floor	Floor			Airflow	Sensible	Latent	Dry B	Sensible	Total
		Sensible	CLTD	Sensible	CLTD	(Cfm)	(Btuh)	(Btuh)	Temp.	Load	(Btuh)
		(Btuh)	(F)	(Btuh)	(F)			(Btuh)	(F)	(Btuh)	(Btuh)
3	ASSEMBLY HALL	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)

(At time of Coil Peak)

			Exposed	Expsd					Plenm	Ceiling		
Room			Floor	Floor	Partition	Part.	Infilt.	Infilt.	Infilt.	Dry B	Sensible	
Number	Description		Sensible	CLTD	Sensible	CLTD	Airflow	Sensible	Latent	Temp.	Load	
			(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	
Zone	3	Total/Ave.	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
Zone	3	Block	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
System	3	Total/Ave.	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
System	3	Block	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
5	CLOTHING ISSUE		-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
Zone	5	Total/Ave.	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
Zone	5	Block	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
System	5	Total/Ave.	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
System	5	Block	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
7	CHAPEL-AUDTRM		-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
Zone	7	Total/Ave.	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
Zone	7	Block	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
System	7	Total/Ave.	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
System	7	Block	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150

HEATING LOADS AT AUX COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

BUILDING ENVELOPE HEATING LOADS

(Roof - Skylight)

(At time of Auxiliary Coil Peak)

Room Number	Description	Roof		Roof		Skylight		Skylt Solar CLF	Skylight		Skylight	
		Return Air Sensible Load (Btuh)	R.A. CLTD (F)	Space Sensible Load (Btuh)	Space CLTD (F)	Return Air Solar (Btuh)	Space Solar (Btuh)		Return Air Conduction Load (Btuh)	Skylt R.A. CLTD (F)	Space Conduction Load (Btuh)	Skylt Space CLTD (F)
1	ADMIN OFFICES	0	0.0	-36,365	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-36,365	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Block	0	0.0	-36,365	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Total/Ave.	0	0.0	-36,365	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Block	0	0.0	-36,365	-67.0	0	0	0.000	0	0.0	0	0.0
4	MEDICAL CLINIC	0	0.0	-27,565	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-27,565	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Block	0	0.0	-27,565	-67.0	0	0	0.000	0	0.0	0	0.0
System	4 Total/Ave.	0	0.0	-27,565	-67.0	0	0	0.000	0	0.0	0	0.0
System	4 Block	0	0.0	-27,565	-67.0	0	0	0.000	0	0.0	0	0.0
6	OFFICES-STORE	0	0.0	-19,210	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	6 Total/Ave.	0	0.0	-19,210	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	6 Block	0	0.0	-19,210	-67.0	0	0	0.000	0	0.0	0	0.0
System	6 Total/Ave.	0	0.0	-19,210	-67.0	0	0	0.000	0	0.0	0	0.0
System	6 Block	0	0.0	-19,210	-67.0	0	0	0.000	0	0.0	0	0.0

BUILDING ENVELOPE HEATING LOADS

(Wall - Window)

(At time of Auxiliary Coil Peak)

Room Number	Description	Wall		Wall		Glass		Glass Solar CLF	Glass		Glass	
		Plenum Load (Btuh)	Plenn CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)		Space Conduction Load (Btuh)	Glass CLTD (F)	Return Air Conduction Load (Btuh)	Glass R.A. CLTD (F)
1	ADMIN OFFICES	0	0.0	-48,735	-67.0	0	0	0.000	-27,893	-67.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-48,735	-67.0	0	0	0.000	-27,893	-67.0	0	0.0
Zone	1 Block	0	0.0	-48,735	-67.0	0	0	0.000	-27,893	-67.0	0	0.0
System	1 Total/Ave.	0	0.0	-48,735	-67.0	0	0	0.000	-27,893	-67.0	0	0.0
System	1 Block	0	0.0	-48,735	-67.0	0	0	0.000	-27,893	-67.0	0	0.0
4	MEDICAL CLINIC	0	0.0	-30,971	-67.0	0	0	0.000	-32,929	-67.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-30,971	-67.0	0	0	0.000	-32,929	-67.0	0	0.0
Zone	4 Block	0	0.0	-30,971	-67.0	0	0	0.000	-32,929	-67.0	0	0.0
System	4 Total/Ave.	0	0.0	-30,971	-67.0	0	0	0.000	-32,929	-67.0	0	0.0
System	4 Block	0	0.0	-30,971	-67.0	0	0	0.000	-32,929	-67.0	0	0.0
6	OFFICES-STORE	0	0.0	-15,042	-67.0	0	0	0.000	-2,643	-67.0	0	0.0
Zone	6 Total/Ave.	0	0.0	-15,042	-67.0	0	0	0.000	-2,643	-67.0	0	0.0
Zone	6 Block	0	0.0	-15,042	-67.0	0	0	0.000	-2,643	-67.0	0	0.0
System	6 Total/Ave.	0	0.0	-15,042	-67.0	0	0	0.000	-2,643	-67.0	0	0.0
System	6 Block	0	0.0	-15,042	-67.0	0	0	0.000	-2,643	-67.0	0	0.0

BUILDING ENVELOPE HEATING LOADS

(Exposed Floor - Partitions - Infiltration)

(At time of Auxiliary Coil Peak)

Room		Exposed	Expad					Plenum	Ceiling		
Number	Description	Floor	Floor	Partition	Part.	Infilt.	Infilt.	Infilt.	Dry B	Sensible	
		Sensible	CLTD	Sensible	CLTD	Airflow	Sensible	Latent	Temp.	Load	
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	
										Envelope	
										Total	
										(Btuh)	
1	ADMIN OFFICES	-34,867	-67.0	0	0.0	963	-68,526	0	70.0	0	-216,386

HEATING LOADS AT AUX COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Auxiliary Coil Peak)

Room Number	Description	Exposed Floor	Expsd Floor	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope
		Sensible (Btuh)	CLTD (F)	Sensible (Btuh)	CLTD (F)	Airflow (Cfm)	Sensible (Btuh)	Latent (Btuh)	Dry B Temp. (F)	Sensible Load (Btuh)	Total (Btuh)
Zone	1 Total/Ave.	-34,867	-67.0	0	0.0	963	-68,526	0	70.0	0	-216,386
Zone	1 Block	-34,867	-67.0	0	0.0	963	-68,526	0	70.0	0	-216,386
System	1 Total/Ave.	-34,867	-67.0	0	0.0	963	-68,526	0	70.0	0	-216,386
System	1 Block	-34,867	-67.0	0	0.0	963	-68,526	0	70.0	0	-216,386
4	MEDICAL CLINIC	-12,179	-67.0	0	0.0	664	-47,249	0	70.0	0	-150,894
Zone	4 Total/Ave.	-12,179	-67.0	0	0.0	664	-47,249	0	70.0	0	-150,894
Zone	4 Block	-12,179	-67.0	0	0.0	664	-47,249	0	70.0	0	-150,894
System	4 Total/Ave.	-12,179	-67.0	0	0.0	664	-47,249	0	70.0	0	-150,894
System	4 Block	-12,179	-67.0	0	0.0	664	-47,249	0	70.0	0	-150,894
6	OFFICES-STORE	-7,341	-67.0	0	0.0	277	-19,711	0	70.0	0	-63,947
Zone	6 Total/Ave.	-7,341	-67.0	0	0.0	277	-19,711	0	70.0	0	-63,947
Zone	6 Block	-7,341	-67.0	0	0.0	277	-19,711	0	70.0	0	-63,947
System	6 Total/Ave.	-7,341	-67.0	0	0.0	277	-19,711	0	70.0	0	-63,947
System	6 Block	-7,341	-67.0	0	0.0	277	-19,711	0	70.0	0	-63,947



----- BUILDING ENVELOPE HEATING LOADS -----  
(Roof - Skylight)  
(At time of Space Peak)

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Wall - Window)  
(At time of Space Peak)

----- BUILDING ENVELOPE HEATING LOADS -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor	Expsd Floor	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope Total (Btuh)
		Sensible (Btuh)	CLTD (F)	Sensible (Btuh)	CLTD (F)	Airflow (Cfm)	Sensible (Btuh)	Latent (Btuh)	Dry B Temp. (F)	Sensible Load (Btuh)	
3	ASSEMBLY HALL	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor	Expad Floor	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope Total
		Sensible (Btuh)	CLTD (F)	Sensible (Btuh)	CLTD (F)	Airflow (Cfm)	Sensible (Btuh)	Latent (Btuh)	Dry B Temp. (F)	Sensible Load (Btuh)	
Zone	3 Total/Ave.	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
Zone	3 Block	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
System	3 Total/Ave.	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
System	3 Block	-890	-67.0	0	0.0	445	-31,666	0	70.0	0	-97,670
5	CLOTHING ISSUE	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
Zone	5 Total/Ave.	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
Zone	5 Block	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
System	5 Total/Ave.	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
System	5 Block	-11,066	-67.0	0	0.0	662	-47,107	0	63.5	-26,073	-150,367
7	CHAPEL-AUDTRM	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
Zone	7 Total/Ave.	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
Zone	7 Block	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
System	7 Total/Ave.	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150
System	7 Block	-12,902	-67.0	0	0.0	740	-52,658	0	70.0	0	-136,150

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- AIR FLOW COOLING LOADS -----  
(At time of Coil Peak)

		----- Ventilation -----			----- Optional Ventilation -----			----- Bypass -----			Ov/Undr
Room		Airflow	Sensible	Latent	Airflow	Sensible	Latent	Airflow	Sensible	Latent	Sizing
Number	Description	(Cfm)	(Btuh)	(Btuh)	(Cfm)	(Btuh)	(Btuh)	(Cfm)	(Btuh)	(Btuh)	(Btuh)
1	ADMIN OFFICES	1,260	25,426	47,029	0	0	0	0	0	0	0
Zone	1 Total/Ave.	1,260	25,426	47,029	0	0	0	0	0	0	-123,523
Zone	1 Block	1,260	25,426	47,029	0	0	0	0	0	0	0
System	1 Total/Ave.	1,260	25,426	47,029	0	0	0	0	0	0	-123,523
System	1 Block	1,260	25,426	47,029	0	0	0	0	0	0	0
2	COMPUTER ROOM	0	0	0	0	0	0	0	0	0	0
Zone	2 Total/Ave.	0	0	0	0	0	0	0	0	0	0
Zone	2 Block	0	0	0	0	0	0	0	0	0	0
System	2 Total/Ave.	0	0	0	0	0	0	0	0	0	0
System	2 Block	0	0	0	0	0	0	0	0	0	0
3	ASSEMBLY HALL	770	15,538	27,356	0	0	0	0	0	0	0
Zone	3 Total/Ave.	770	15,538	27,356	0	0	0	0	0	0	0
Zone	3 Block	770	15,538	27,356	0	0	0	0	0	0	0
System	3 Total/Ave.	770	15,538	27,356	0	0	0	0	0	0	0
System	3 Block	770	15,538	27,356	0	0	0	0	0	0	0
4	MEDICAL CLINIC	1,270	25,628	47,402	0	0	0	0	0	0	34,342
Zone	4 Total/Ave.	1,270	25,628	47,402	0	0	0	0	0	0	0
Zone	4 Block	1,270	25,628	47,402	0	0	0	0	0	0	34,342
System	4 Total/Ave.	1,270	25,628	47,402	0	0	0	0	0	0	0
System	4 Block	1,270	25,628	47,402	0	0	0	0	0	0	0
6	OFFICES-STORE	700	14,126	26,127	0	0	0	0	0	0	35,795
Zone	6 Total/Ave.	700	14,126	26,127	0	0	0	0	0	0	0
Zone	6 Block	700	14,126	26,127	0	0	0	0	0	0	35,795
System	6 Total/Ave.	700	14,126	26,127	0	0	0	0	0	0	0
System	6 Block	700	14,126	26,127	0	0	0	0	0	0	366
7	CHAPEL-AUDTRM	2,400	46,710	42,720	0	0	0	0	0	0	366
Zone	7 Total/Ave.	2,400	46,710	42,720	0	0	0	0	0	0	366
Zone	7 Block	2,400	46,710	42,720	0	0	0	0	0	0	366
System	7 Total/Ave.	2,400	46,710	42,720	0	0	0	0	0	0	366
System	7 Block	2,400	46,710	42,720	0	0	0	0	0	0	366

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
 BLDG 2100 BASERUN FT LEONARD WOOD

----- AIRFLOW HEATING LOADS -----

(At time of Coil Peak)

		--- Ventilation ---		Op. Vent.-----		Reheat -----		Humidif. ----		Total
Room		Airflow	Sensible	Airflow	Sensible	Airflow	Sensible	Airflow	Latent	
Number	Description	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Btuh)
3	ASSEMBLY HALL	770	-54,792	0	0	0	0	0	0	-54,792
Zone	3 Total/Ave.	770	-54,792	0	0	0	0	0	0	-54,792
Zone	3 Block	770	-54,792	0	0	0	0	0	0	-54,792
System	3 Total/Ave.	770	-54,792	0	0	0	0	0	0	-54,792
System	3 Block	770	-54,792	0	0	0	0	0	0	-54,792
5	CLOTHING ISSUE	770	-54,792	0	0	0	0	0	0	-54,792
Zone	5 Total/Ave.	770	-54,792	0	0	0	0	0	0	-54,792
Zone	5 Block	770	-54,792	0	0	0	0	0	0	-54,792
System	5 Total/Ave.	770	-54,792	0	0	0	0	0	0	-54,792
System	5 Block	770	-54,792	0	0	0	0	0	0	-54,792
7	CHAPEL-AUDTRM	2,400	-170,781	0	0	0	0	0	0	-170,781
Zone	7 Total/Ave.	2,400	-170,781	0	0	0	0	0	0	-170,781
Zone	7 Block	2,400	-170,781	0	0	0	0	0	0	-170,781
System	7 Total/Ave.	2,400	-170,781	0	0	0	0	0	0	-170,781
System	7 Block	2,400	-170,781	0	0	0	0	0	0	-170,781

COOLING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- AIR FLOW HEAT GAIN AND LOSS -----  
(At time of Coil Peak)

		Cooling											
Room Number	Description	Duct	Supply	Return	System	System		Room	Run				System
		Heat	Fan	Fan	Exhaust	Exhaust	Exhaust	Ducted	Plenum	Around	Corridr	Return	
		Pickup	Heat	Heat	Heat Loss	Total	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow
		(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)	(Cfm)
1	ADMIN OFFICES	0	42,174	0	0	42,174	1,260	0	19,769	0	0	0	19,769
Zone	1 Total/Ave.	0	42,174	0	0	42,174	1,260	0	19,769	0	0	0	19,769
Zone	1 Block	0	42,174	0	0	42,174	1,260	0	19,769	0	0	0	19,769
System	1 Total/Ave.	0	42,174	0	0	42,174	1,260	0	19,769	0	0	0	19,769
System	1 Block	0	42,174	0	0	42,174	1,260	0	19,769	0	0	0	19,769
2	COMPUTER ROOM	0	1,991	0	0	1,991	0	0	0	0	0	0	5,600
Zone	2 Total/Ave.	0	1,991	0	0	1,991	0	0	0	0	0	0	5,600
Zone	2 Block	0	1,991	0	0	1,991	0	0	0	0	0	0	5,600
System	2 Total/Ave.	0	1,991	0	0	1,991	0	0	0	0	0	0	5,600
System	2 Block	0	1,991	0	0	1,991	0	0	0	0	0	0	5,600
3	ASSEMBLY HALL	0	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
Zone	3 Total/Ave.	0	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
Zone	3 Block	0	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
System	3 Total/Ave.	0	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
System	3 Block	0	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
4	MEDICAL CLINIC	0	28,489	0	0	28,489	1,270	0	10,683	0	0	0	10,683
Zone	4 Total/Ave.	0	28,489	0	0	28,489	1,270	0	10,683	0	0	0	10,683
Zone	4 Block	0	28,489	0	0	28,489	1,270	0	10,683	0	0	0	10,683
System	4 Total/Ave.	0	28,489	0	0	28,489	1,270	0	10,683	0	0	0	10,683
System	4 Block	0	28,489	0	0	28,489	1,270	0	10,683	0	0	0	10,683
6	OFFICES-STORE	0	9,930	0	0	9,930	700	0	5,032	0	0	0	5,032
Zone	6 Total/Ave.	0	9,930	0	0	9,930	700	0	5,032	0	0	0	5,032
Zone	6 Block	0	9,930	0	0	9,930	700	0	5,032	0	0	0	5,032
System	6 Total/Ave.	0	9,930	0	0	9,930	700	0	5,032	0	0	0	5,032
System	6 Block	0	9,930	0	0	9,930	700	0	5,032	0	0	0	5,032
7	CHAPEL-AUDTRM	0	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
Zone	7 Total/Ave.	0	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
Zone	7 Block	0	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
System	7 Total/Ave.	0	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
System	7 Block	0	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000

HEATING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

AIRFLOW HEAT GAIN AND LOSS  
(At time of Coil Peak)

		Heating										
Room Number	Description	Supply	Return	System		System	Room			Run		System
		Fan	Fan	Exhaust		Exhaust	Exhaust	Ducted	Plenum	Around	Corridor	Return
		Heat	Heat	Heat Loss	Total	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow	Airflow
		(Btuh)	(Btuh)	(Btuh)	(Btuh)	(cfm)	(cfm)	(cfm)	(cfm)	(cfm)	(cfm)	(cfm)
3	ASSEMBLY HALL	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
Zone	3 Total/Ave.	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
Zone	3 Block	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
System	3 Total/Ave.	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
System	3 Block	12,272	0	0	12,272	770	0	7,670	0	0	0	7,670
5	CLOTHING ISSUE	7,402	0	0	7,402	770	0	7,710	0	0	0	7,710
Zone	5 Total/Ave.	7,402	0	0	7,402	770	0	7,710	0	0	0	7,710
Zone	5 Block	7,402	0	0	7,402	770	0	7,710	0	0	0	7,710
System	5 Total/Ave.	7,402	0	0	7,402	770	0	7,710	0	0	0	7,710
System	5 Block	7,402	0	0	7,402	770	0	7,710	0	0	0	7,710
7	CHAPEL-AUDTRM	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
Zone	7 Total/Ave.	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
Zone	7 Block	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
System	7 Total/Ave.	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000
System	7 Block	16,000	0	0	16,000	2,400	0	12,000	0	0	0	12,000

AUX. HEAT AIR HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

A I R F L O W H E A T G A I N A N D L O S S

(At time of Auxiliary Coil Peak)

Room Number	Description	Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	Heating							System Return Airflow (Cfm)
					Total (Btuh)	System Exhaust (Cfm)	Room Exhaust (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around (Cfm)	Corridor Airflow (Cfm)	
1	ADMIN OFFICES	0	0	0	0	12,870	0	12,870	0	0	0	12,870
Zone	1 Total/Ave.	0	0	0	0	12,870	0	12,870	0	0	0	12,870
Zone	1 Block	0	0	0	0	12,870	0	12,870	0	0	0	12,870
System	1 Total/Ave.	0	0	0	0	12,870	0	12,870	0	0	0	12,870
System	1 Block	0	0	0	0	12,870	0	12,870	0	0	0	12,870
4	MEDICAL CLINIC	0	0	0	0	3,240	0	3,240	0	0	0	3,240
Zone	4 Total/Ave.	0	0	0	0	3,240	0	3,240	0	0	0	3,240
Zone	4 Block	0	0	0	0	3,240	0	3,240	0	0	0	3,240
System	4 Total/Ave.	0	0	0	0	3,240	0	3,240	0	0	0	3,240
System	4 Block	0	0	0	0	3,240	0	3,240	0	0	0	3,240
6	OFFICES-STORE	0	0	0	0	1,980	0	1,980	0	0	0	1,980
Zone	6 Total/Ave.	0	0	0	0	1,980	0	1,980	0	0	0	1,980
Zone	6 Block	0	0	0	0	1,980	0	1,980	0	0	0	1,980
System	6 Total/Ave.	0	0	0	0	1,980	0	1,980	0	0	0	1,980
System	6 Block	0	0	0	0	1,980	0	1,980	0	0	0	1,980



ROOM PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 2100 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C   S T A T E   P O I N T S -----

Room            2

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	63.4	53.7	73.2	29.4	
Main System						0.0
Return Air Heat Pickup						0.0
Return Fan						
Return Air	75.0	63.4	53.7	73.2	29.4	
Outdoor Air	82.9	69.9	53.3	94.8	34.8	
Return/Outdoor Air Mix	75.0	63.4	53.7	73.2	29.4	
Blow through Fan						0.1
Entering Coil	75.1	63.4	53.4	73.2	29.5	
Leaving Coil	63.4	59.3	79.4	72.9	26.6	
Draw Through Fan						0.0
Duct Frictional Heat						0.2
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	63.6	59.4	78.9	72.9	26.6	
Supply Air	63.6	59.4	78.9	72.9	26.6	
Percent Outside Air		0.00	(%)			
Sensible Heat Ratio (SHR)		0.962				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		5,600	(Cfm)			

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- PSYCHROMETRIC STATE POINTS -----

Zone 3

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	62.9	51.9	70.8	29.1	
Main System						0.0
Return Air Heat Pickup						0.0
Return Fan						
Return Air	75.0	62.9	51.9	70.8	29.1	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	76.9	64.6	52.4	76.2	30.4	
Blow through Fan						0.0
Entering Coil	76.9	64.6	52.4	76.2	30.4	
Leaving Coil	55.6	54.1	91.4	63.2	23.1	
Draw Through Fan						0.4
Duct Frictional Heat						1.1
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	57.1	54.7	86.5	63.2	23.5	
Supply Air	57.1	54.7	86.5	63.2	23.5	
Percent Outside Air		10.04	(%)			
Sensible Heat Ratio (SHR)		0.780				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		7,670	(Cfm)			

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 2100 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C S T A T E P O I N T S -----

Zone 7

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	68.1	71.0	97.5	33.2	
Main System						0.0
Return Air Heat Pickup						0.0
Return Fan						
Return Air	75.0	68.1	71.0	97.5	33.2	
Outdoor Air	93.3	77.4	49.9	124.1	41.9	
Return/Outdoor Air Mix	78.7	70.1	66.3	102.8	35.0	
Blow through Fan						0.0
Entering Coil	78.7	70.1	66.3	102.8	35.0	
Leaving Coil	67.3	64.9	88.2	93.2	30.7	
Draw Through Fan						0.3
Duct Frictional Heat						0.9
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	68.6	65.3	84.5	93.2	31.0	
Supply Air	68.6	65.3	84.5	93.2	31.0	
Percent Outside Air		20.00	(%)			
Sensible Heat Ratio (SHR)		0.703				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		12,000	(Cfm)			

SYSTEM PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 2100 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C   S T A T E   P O I N T S -----

System 1

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	62.3	50.0	68.2	28.7	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	62.3	50.0	68.2	28.7	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	76.2	63.5	50.5	71.7	29.5	
Blow through Fan						0.0
Entering Coil	76.2	63.5	50.5	71.7	29.5	
Leaving Coil	56.9	54.9	88.4	64.2	23.6	
Draw Through Fan						0.5
Duct Frictional Heat						1.5
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	58.9	55.7	82.2	64.2	24.1	
Supply Air	58.9	55.7	82.2	64.2	24.1	
Percent Outside Air		6.37	(%)			
Sensible Heat Ratio (SHR)		0.853				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		19,769	(Cfm)			

SYSTEM PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C   S T A T E   P O I N T S -----

System        4

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	62.3	50.0	68.2	28.7	
Main System						0.0
Return Air Heat Pickup						0.0
Return Fan						
Return Air	75.0	62.3	50.0	68.2	28.7	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	77.2	64.4	50.8	74.8	30.2	
Blow through Fan						0.0
Entering Coil	77.2	64.4	50.8	74.8	30.2	
Leaving Coil	55.9	54.3	90.6	63.5	23.3	
Draw Through Fan						0.6
Duct Frictional Heat						1.9
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	58.4	55.3	82.7	63.5	23.9	
Supply Air	58.4	55.3	82.7	63.5	23.9	
Percent Outside Air		11.82	(%)			
Sensible Heat Ratio (SHR)		0.835				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		10,740	(Cfm)			

SYSTEM PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C   S T A T E   P O I N T S -----

System        6

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	62.3	50.0	68.2	28.7	
Main System						0.0
Return Air Heat Pickup						0.0
Return Fan						
Return Air	75.0	62.3	50.0	68.2	28.7	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	77.6	64.8	50.9	75.9	30.5	
Blow through Fan						0.0
Entering Coil	77.6	64.8	50.9	75.9	30.5	
Leaving Coil	56.1	54.5	90.9	64.1	23.4	
Draw Through Fan						0.5
Duct Frictional Heat						1.4
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	58.0	55.3	85.0	64.1	23.9	
Supply Air	58.0	55.3	85.0	64.1	23.9	
Percent Outside Air		13.91	(%)			
Sensible Heat Ratio (SHR)		0.857				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		5,032	(Cfm)			

BUILDING U-VALUES - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G U - V A L U E S -----

Room U-Values (Btu/hr/sqft/F)											Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
Room Number	Description	Part.	ExFlr	Summr Skylt	Wintr Skylt	Roof	Summr Windo	Wintr Windo	Wall	Ceill.		
1	ADMIN OFFICES	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.097	0.000	45.8	9.81
Zone	1 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.097	0.000	45.8	9.81
System	1 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.097	0.000	45.8	9.81
2	COMPUTER ROOM	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.092	0.000	65.0	13.67
Zone	2 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.092	0.000	65.0	13.67
System	2 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.092	0.000	65.0	13.67
3	ASSEMBLY HALL	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.094	0.000	49.2	10.53
Zone	3 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.094	0.000	49.2	10.53
System	3 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.094	0.000	49.2	10.53
4	MEDICAL CLINIC	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.093	0.000	44.4	9.54
Zone	4 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.093	0.000	44.4	9.54
System	4 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.093	0.000	44.4	9.54
5	CLOTHING ISSUE	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.116	0.317	45.1	9.67
Zone	5 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.116	0.317	45.1	9.67
System	5 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.116	0.317	45.1	9.67
6	OFFICES-STORE	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.104	0.000	33.6	7.22
Zone	6 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.104	0.000	33.6	7.22
System	6 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.104	0.000	33.6	7.22
7	CHAPEL-AUDTRM	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.097	0.000	69.8	14.66
Zone	7 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.097	0.000	69.8	14.66
System	7 Total/Ave.	0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.097	0.000	69.8	14.66
Building		0.347	0.830	0.000	0.000	0.029	0.621	0.655	0.100	0.317	46.2	9.88

BUILDING AREAS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   A R E A S -----

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room	Total Floor Area	Partition Area	Exposed Floor Area	Skylight Area	Skl /Rf	Net Roof Area	Window Area	Win /Wl	Net Wall Area
		Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	ADMIN OFFICES	1	1	18,716	18,716	11,076	627	0	0	18,716	636	8	7,526
Zone	1 Total/Ave.				18,716	11,076	627	0	0	18,716	636	8	7,526
System	1 Total/Ave.				18,716	11,076	627	0	0	18,716	636	8	7,526
2	COMPUTER ROOM	1	1	861	861	501	62	0	0	861	120	14	748
Zone	2 Total/Ave.				861	501	62	0	0	861	120	14	748
System	2 Total/Ave.				861	501	62	0	0	861	120	14	748
3	ASSEMBLY HALL	1	1	7,667	7,667	7,340	16	0	0	8,081	728	21	2,782
Zone	3 Total/Ave.				7,667	7,340	16	0	0	8,081	728	21	2,782
System	3 Total/Ave.				7,667	7,340	16	0	0	8,081	728	21	2,782
4	MEDICAL CLINIC	1	1	14,142	14,142	9,258	219	0	0	14,187	751	13	4,955
Zone	4 Total/Ave.				14,142	9,258	219	0	0	14,187	751	13	4,955
System	4 Total/Ave.				14,142	9,258	219	0	0	14,187	751	13	4,955
5	CLOTHING ISSUE	1	1	12,680	12,680	5,875	199	0	0	12,680	54	1	5,388
Zone	5 Total/Ave.				12,680	5,875	199	0	0	12,680	54	1	5,388
System	5 Total/Ave.				12,680	5,875	199	0	0	12,680	54	1	5,388
6	OFFICES-STORE	1	1	13,222	13,222	7,668	132	0	0	9,887	60	3	2,166
Zone	6 Total/Ave.				13,222	7,668	132	0	0	9,887	60	3	2,166
System	6 Total/Ave.				13,222	7,668	132	0	0	9,887	60	3	2,166
7	CHAPEL-AUDTRM	1	1	7,501	7,501	9,162	232	0	0	7,963	396	6	5,826
Zone	7 Total/Ave.				7,501	9,162	232	0	0	7,963	396	6	5,826
System	7 Total/Ave.				7,501	9,162	232	0	0	7,963	396	6	5,826
Building					74,789	50,879	1,487	0	0	72,375	2,746	9	29,390

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.029 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.144 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.064 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.51 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 10.38 (Btu/Hr/Sq Ft)



SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

Main System 1 VAVFSK VAV WITH FORCED FLO SKIN

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.2	18	509	-20,235	63	239	626.5	18	538	0.0	0	0
5 - 10	4.5	11	318	-40,470	25	95	1,253.0	10	297	0.0	0	0
10 - 15	6.7	9	262	-60,705	12	47	1,879.5	7	203	0.0	0	0
15 - 20	8.9	5	133	-80,940	0	0	2,506.0	6	178	0.0	0	0
20 - 25	11.2	5	149	-101,175	0	0	3,132.5	4	105	0.0	0	0
25 - 30	13.4	4	117	-121,410	0	0	3,759.0	5	135	0.0	0	0
30 - 35	15.6	3	75	-141,645	0	0	4,385.5	2	56	0.0	0	0
35 - 40	17.9	3	87	-161,880	0	0	5,012.0	4	112	0.0	0	0
40 - 45	20.1	1	40	-182,115	0	0	5,638.5	2	64	0.0	0	0
45 - 50	22.3	4	111	-202,350	0	0	6,265.0	0	0	0.0	0	0
50 - 55	24.6	8	213	-222,585	0	0	6,891.5	1	23	0.0	0	0
55 - 60	26.8	11	318	-242,820	0	0	7,518.0	3	89	0.0	0	0
60 - 65	29.0	10	283	-263,055	0	0	8,144.5	1	20	0.0	0	0
65 - 70	31.3	6	166	-283,290	0	0	8,771.0	1	20	0.0	0	0
70 - 75	33.5	0	0	-303,525	0	0	9,397.5	0	0	0.0	0	0
75 - 80	35.7	0	0	-323,760	0	0	10,024.0	1	20	0.0	0	0
80 - 85	38.0	0	0	-343,995	0	0	10,650.5	1	44	0.0	0	0
85 - 90	40.2	0	0	-364,230	0	0	11,277.0	1	43	0.0	0	0
90 - 95	42.4	0	0	-384,465	0	0	11,903.5	0	0	0.0	0	0
95 - 100	44.7	0	0	-404,700	0	0	12,530.0	35	1,048	0.0	0	0
Hours Off	0.0	0	5,979	0	0	8,379	0.0	0	5,765	0.0	0	8,760

Main System 2 PTAC PACKAGED TERMINAL AIR COND.

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.5	0	0	-18,813	0	0	280.0	0	0	0.0	0	0
5 - 10	1.0	0	0	-37,626	0	0	560.0	0	0	0.0	0	0
10 - 15	1.5	0	0	-56,439	0	0	840.0	0	0	0.0	0	0
15 - 20	2.0	0	0	-75,252	0	0	1,120.0	0	0	0.0	0	0
20 - 25	2.6	5	424	-94,065	0	0	1,400.0	0	0	0.0	0	0
25 - 30	3.1	36	3,155	-112,878	0	0	1,680.0	0	0	0.0	0	0
30 - 35	3.6	23	2,039	-131,691	0	0	1,960.0	0	0	0.0	0	0
35 - 40	4.1	9	829	-150,504	0	0	2,240.0	0	0	0.0	0	0
40 - 45	4.6	5	444	-169,317	0	0	2,520.0	0	0	0.0	0	0
45 - 50	5.1	13	1,171	-188,130	0	0	2,800.0	0	0	0.0	0	0
50 - 55	5.6	6	550	-206,943	0	0	3,080.0	0	0	0.0	0	0
55 - 60	6.1	2	148	-225,756	0	0	3,360.0	0	0	0.0	0	0
60 - 65	6.6	0	0	-244,569	0	0	3,640.0	0	0	0.0	0	0
65 - 70	7.2	0	0	-263,382	0	0	3,920.0	0	0	0.0	0	0
70 - 75	7.7	0	0	-282,194	0	0	4,200.0	0	0	0.0	0	0
75 - 80	8.2	0	0	-301,007	0	0	4,480.0	0	0	0.0	0	0
80 - 85	8.7	0	0	-319,820	0	0	4,760.0	0	0	0.0	0	0
85 - 90	9.2	0	0	-338,633	0	0	5,040.0	0	0	0.0	0	0
90 - 95	9.7	0	0	-357,446	0	0	5,320.0	0	0	0.0	0	0
95 - 100	10.2	0	0	-376,259	0	0	5,600.0	100	8,760	0.0	0	0
Hours Off	0.0	0	0	0	0	8,760	0.0	0	0	0.0	0	8,760

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

Main System 3 SZ SINGLE ZONE

Percent Design Load	Cooling Load			Heating Load			Cooling Airflow			Heating Airflow		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	1.5	20	562	-15,960	19	160	383.5	0	0	0.0	0	0
5 - 10	3.1	13	349	-31,920	16	133	767.0	0	0	0.0	0	0
10 - 15	4.6	10	283	-47,880	26	221	1,150.5	0	0	0.0	0	0
15 - 20	6.2	9	260	-63,840	40	337	1,534.0	0	0	0.0	0	0
20 - 25	7.7	6	173	-79,800	0	0	1,917.5	0	0	0.0	0	0
25 - 30	9.3	9	240	-95,760	0	0	2,301.0	0	0	0.0	0	0
30 - 35	10.8	8	236	-111,720	0	0	2,684.5	0	0	0.0	0	0
35 - 40	12.4	7	194	-127,680	0	0	3,068.0	0	0	0.0	0	0
40 - 45	13.9	5	129	-143,640	0	0	3,451.5	0	0	0.0	0	0
45 - 50	15.5	7	190	-159,600	0	0	3,835.0	0	0	0.0	0	0
50 - 55	17.0	4	108	-175,560	0	0	4,218.5	0	0	0.0	0	0
55 - 60	18.6	2	62	-191,520	0	0	4,602.0	0	0	0.0	0	0
60 - 65	20.1	0	0	-207,480	0	0	4,985.5	0	0	0.0	0	0
65 - 70	21.7	0	0	-223,440	0	0	5,369.0	0	0	0.0	0	0
70 - 75	23.2	0	0	-239,400	0	0	5,752.5	0	0	0.0	0	0
75 - 80	24.8	0	0	-255,360	0	0	6,136.0	0	0	0.0	0	0
80 - 85	26.3	0	0	-271,320	0	0	6,519.5	0	0	0.0	0	0
85 - 90	27.8	0	0	-287,280	0	0	6,903.0	0	0	0.0	0	0
90 - 95	29.4	0	0	-303,240	0	0	7,286.5	0	0	0.0	0	0
95 - 100	30.9	0	0	-319,200	0	0	7,670.0	100	8,760	0.0	0	0
Hours Off	0.0	0	5,974	0	0	7,909	0.0	0	0	0.0	0	8,760

Main System 4 VAVFSK VAV WITH FORCED FLO SKIN

Percent Design Load	Cooling Load			Heating Load			Cooling Airflow			Heating Airflow		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.2	14	342	-29,650	72	2,055	537.0	14	358	0.0	0	0
5 - 10	4.5	12	295	-59,300	28	795	1,074.0	9	238	0.0	0	0
10 - 15	6.7	13	310	-88,950	0	0	1,611.0	7	174	0.0	0	0
15 - 20	9.0	9	225	-118,600	0	0	2,148.0	7	165	0.0	0	0
20 - 25	11.2	8	184	-148,250	0	0	2,685.0	7	188	0.0	0	0
25 - 30	13.5	9	205	-177,900	0	0	3,222.1	5	120	0.0	0	0
30 - 35	15.7	12	289	-207,550	0	0	3,759.1	6	147	0.0	0	0
35 - 40	18.0	4	89	-237,200	0	0	4,296.1	6	148	0.0	0	0
40 - 45	20.2	6	143	-266,850	0	0	4,833.1	4	101	0.0	0	0
45 - 50	22.5	7	175	-296,500	0	0	5,370.1	2	62	0.0	0	0
50 - 55	24.7	4	105	-326,150	0	0	5,907.1	3	86	0.0	0	0
55 - 60	27.0	1	20	-355,800	0	0	6,444.1	3	87	0.0	0	0
60 - 65	29.2	0	0	-385,450	0	0	6,981.1	8	194	0.0	0	0
65 - 70	31.5	0	0	-415,100	0	0	7,518.1	2	62	0.0	0	0
70 - 75	33.7	0	0	-444,750	0	0	8,055.1	5	129	0.0	0	0
75 - 80	36.0	0	0	-474,400	0	0	8,592.1	4	108	0.0	0	0
80 - 85	38.2	0	0	-504,050	0	0	9,129.2	5	125	0.0	0	0
85 - 90	40.5	0	0	-533,700	0	0	9,666.2	2	43	0.0	0	0
90 - 95	42.7	0	0	-563,350	0	0	10,203.2	0	0	0.0	0	0
95 - 100	45.0	0	0	-593,000	0	0	10,740.2	0	0	0.0	0	0
Hours Off	0.0	0	6,378	0	0	5,910	0.0	0	6,225	0.0	0	8,760

Trane Air Conditioning Economics  
By: Trane Customer Direct Service Network

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

Main System 5 SZ SINGLE ZONE

Percent Design Load	Cooling Load			Heating Load			Cooling Airflow			Heating Airflow		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.0	0	0	-19,860	13	314	385.5	0	0	0.0	0	0
5 - 10	0.0	0	0	-39,720	26	603	771.0	0	0	0.0	0	0
10 - 15	0.0	0	0	-59,580	35	809	1,156.5	0	0	0.0	0	0
15 - 20	0.0	0	0	-79,440	26	612	1,542.0	0	0	0.0	0	0
20 - 25	0.0	0	0	-99,300	0	0	1,927.5	0	0	0.0	0	0
25 - 30	0.0	0	0	-119,160	0	0	2,313.0	0	0	0.0	0	0
30 - 35	0.0	0	0	-139,020	0	0	2,698.5	0	0	0.0	0	0
35 - 40	0.0	0	0	-158,880	0	0	3,084.0	0	0	0.0	0	0
40 - 45	0.0	0	0	-178,740	0	0	3,469.5	0	0	0.0	0	0
45 - 50	0.0	0	0	-198,600	0	0	3,855.0	0	0	0.0	0	0
50 - 55	0.0	0	0	-218,460	0	0	4,240.5	0	0	0.0	0	0
55 - 60	0.0	0	0	-238,320	0	0	4,626.0	0	0	0.0	0	0
60 - 65	0.0	0	0	-258,180	0	0	5,011.5	0	0	0.0	0	0
65 - 70	0.0	0	0	-278,040	0	0	5,397.0	0	0	0.0	0	0
70 - 75	0.0	0	0	-297,900	0	0	5,782.5	0	0	0.0	0	0
75 - 80	0.0	0	0	-317,760	0	0	6,168.0	0	0	0.0	0	0
80 - 85	0.0	0	0	-337,620	0	0	6,553.5	0	0	0.0	0	0
85 - 90	0.0	0	0	-357,480	0	0	6,939.0	0	0	0.0	0	0
90 - 95	0.0	0	0	-377,340	0	0	7,324.5	0	0	0.0	0	0
95 - 100	0.0	0	0	-397,200	0	0	7,710.0	100	5,088	0.0	0	0
Hours Off	0.0	0	8,760	0	0	6,422	0.0	0	3,672	0.0	0	8,760

Main System 6 VAVFSK VAV WITH FORCED FLO SKIN

Percent Design Load	Cooling Load			Heating Load			Cooling Airflow			Heating Airflow		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	1.1	23	639	-14,745	87	2,440	251.6	21	613	0.0	0	0
5 - 10	2.2	15	413	-29,490	13	358	503.2	10	275	0.0	0	0
10 - 15	3.3	9	252	-44,235	0	0	754.8	10	302	0.0	0	0
15 - 20	4.4	8	208	-58,980	0	0	1,005.4	6	182	0.0	0	0
20 - 25	5.5	11	306	-73,725	0	0	1,258.0	7	210	0.0	0	0
25 - 30	6.5	9	258	-88,470	0	0	1,509.6	3	77	0.0	0	0
30 - 35	7.6	9	259	-103,215	0	0	1,761.2	4	115	0.0	0	0
35 - 40	8.7	4	102	-117,960	0	0	2,012.8	3	90	0.0	0	0
40 - 45	9.8	5	131	-132,705	0	0	2,264.4	2	64	0.0	0	0
45 - 50	10.9	5	129	-147,450	0	0	2,516.0	4	105	0.0	0	0
50 - 55	12.0	1	40	-162,195	0	0	2,767.6	2	67	0.0	0	0
55 - 60	13.1	0	0	-176,940	0	0	3,019.2	5	144	0.0	0	0
60 - 65	14.2	0	0	-191,685	0	0	3,270.8	6	179	0.0	0	0
65 - 70	15.3	0	0	-206,430	0	0	3,522.4	4	124	0.0	0	0
70 - 75	16.4	0	0	-221,175	0	0	3,774.0	4	127	0.0	0	0
75 - 80	17.5	0	0	-235,920	0	0	4,025.6	4	110	0.0	0	0
80 - 85	18.5	0	0	-250,665	0	0	4,277.2	3	85	0.0	0	0
85 - 90	19.6	0	0	-265,410	0	0	4,528.8	1	20	0.0	0	0
90 - 95	20.7	0	0	-280,155	0	0	4,780.4	0	0	0.0	0	0
95 - 100	21.8	0	0	-294,900	0	0	5,032.1	0	0	0.0	0	0
Hours Off	0.0	0	6,023	0	0	5,962	0.0	0	5,871	0.0	0	8,760

Trane Air Conditioning Economics  
By: Trane Customer Direct Service Network

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

Main System 7 SZ SINGLE ZONE

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	2.3	22	422	-28,787	11	408	600.0	0	0	0.0	0	0
5 - 10	4.7	17	319	-57,574	22	805	1,200.0	0	0	0.0	0	0
10 - 15	7.0	20	370	-86,361	26	971	1,800.0	0	0	0.0	0	0
15 - 20	9.4	21	402	-115,148	17	634	2,400.0	0	0	0.0	0	0
20 - 25	11.7	10	187	-143,935	24	869	3,000.0	0	0	0.0	0	0
25 - 30	14.1	10	186	-172,721	0	0	3,600.0	0	0	0.0	0	0
30 - 35	16.4	0	0	-201,508	0	0	4,200.0	0	0	0.0	0	0
35 - 40	18.8	0	0	-230,295	0	0	4,800.0	0	0	0.0	0	0
40 - 45	21.1	0	0	-259,082	0	0	5,400.0	0	0	0.0	0	0
45 - 50	23.4	0	0	-287,869	0	0	6,000.0	0	0	0.0	0	0
50 - 55	25.8	0	0	-316,656	0	0	6,600.0	0	0	0.0	0	0
55 - 60	28.1	0	0	-345,443	0	0	7,200.0	0	0	0.0	0	0
60 - 65	30.5	0	0	-374,230	0	0	7,800.0	0	0	0.0	0	0
65 - 70	32.8	0	0	-403,017	0	0	8,400.0	0	0	0.0	0	0
70 - 75	35.2	0	0	-431,804	0	0	9,000.0	0	0	0.0	0	0
75 - 80	37.5	0	0	-460,591	0	0	9,600.0	0	0	0.0	0	0
80 - 85	39.9	0	0	-489,378	0	0	10,200.0	0	0	0.0	0	0
85 - 90	42.2	0	0	-518,164	0	0	10,800.0	0	0	0.0	0	0
90 - 95	44.5	0	0	-546,951	0	0	11,400.0	0	0	0.0	0	0
95 - 100	46.9	0	0	-575,738	0	0	12,000.0	100	8,760	0.0	0	0
Hours Off	0.0	0	6,874	0	0	5,073	0.0	0	0	0.0	0	8,760

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	10.0	74	6,486	-148,050	61	2,345	3,064.1	0	0	0.0	0	0
5 - 10	20.0	5	406	-296,100	30	1,165	6,128.2	0	0	0.0	0	0
10 - 15	29.9	3	256	-444,150	8	313	9,192.3	0	0	0.0	0	0
15 - 20	39.9	3	257	-592,199	0	0	12,256.4	0	0	0.0	0	0
20 - 25	49.9	2	154	-740,249	0	0	15,320.6	0	0	0.0	0	0
25 - 30	59.9	4	346	-888,299	0	0	18,384.7	0	0	0.0	0	0
30 - 35	69.8	4	345	-1,036,349	0	0	21,448.8	0	0	0.0	0	0
35 - 40	79.8	2	190	-1,184,399	0	0	24,512.9	0	0	0.0	0	0
40 - 45	89.8	2	173	-1,332,449	0	0	27,577.0	17	1,502	0.0	0	0
45 - 50	99.8	1	87	-1,480,499	0	0	30,641.1	5	424	0.0	0	0
50 - 55	109.7	1	60	-1,628,549	0	0	33,705.2	61	5,356	0.0	0	0
55 - 60	119.7	0	0	-1,776,599	0	0	36,769.3	3	238	0.0	0	0
60 - 65	129.7	0	0	-1,924,649	0	0	39,833.5	1	105	0.0	0	0
65 - 70	139.7	0	0	-2,072,698	0	0	42,897.6	1	109	0.0	0	0
70 - 75	149.6	0	0	-2,220,748	0	0	45,961.7	2	212	0.0	0	0
75 - 80	159.6	0	0	-2,368,798	0	0	49,025.8	5	452	0.0	0	0
80 - 85	169.6	0	0	-2,516,848	0	0	52,089.9	4	362	0.0	0	0
85 - 90	179.6	0	0	-2,664,898	0	0	55,154.0	0	0	0.0	0	0
90 - 95	189.5	0	0	-2,812,948	0	0	58,218.1	0	0	0.0	0	0
95 - 100	199.5	0	0	-2,960,998	0	0	61,282.2	0	0	0.0	0	0
Hours Off	0.0	0	0	0	0	4,937	0.0	0	0	0.0	0	8,760

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

January		----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton	
1	24.1	19.9	-417,901	0.0	-261,536	2.6		-251,708	2.6		-337,713	2.6		-367,062	2.6	
2	23.4	19.5	-437,905	0.0	-273,104	2.6		-262,513	2.6		-352,947	2.5		-381,414	2.5	
3	23.7	20.0	-448,889	2.5	-275,424	2.5		-265,205	2.5		-357,692	2.5		-384,267	2.5	
4	24.7	21.1	-458,606	2.5	-275,584	2.5		-298,697	2.5		-356,563	2.5		-381,376	2.5	
5	26.3	22.8	-465,678	2.5	-268,059	2.5		-319,698	2.5		-349,721	2.5		-372,892	2.5	
6	28.3	25.0	-457,225	2.4	-296,343	2.5		-297,442	2.5		-324,823	2.5		-346,464	2.5	
7	30.8	27.9	-445,886	2.4	-290,422	2.5		-281,562	2.5		-305,438	2.5		-325,654	2.5	
8	33.5	30.8	-344,656	3.0	-192,387	3.1		-259,555	2.5		-279,721	2.5		-220,896	3.1	
9	36.4	33.5	-279,969	3.5	-165,366	3.6		-239,539	2.6		-255,603	2.6		-183,710	3.6	
10	39.3	35.6	-223,844	4.1	-139,985	4.2		-211,063	2.7		-222,856	2.7		-145,898	4.1	
11	42.1	36.8	-156,871	4.7	-110,805	4.7		-179,219	2.9		-155,005	2.9		-111,627	4.7	
12	44.6	37.5	-103,174	5.0	-94,324	4.8		-148,294	3.1		-114,844	3.0		-95,102	4.8	
13	46.6	38.2	-79,062	5.2	-76,476	4.9		-119,947	3.2		-110,360	3.2		-77,212	4.9	
14	48.2	38.3	-57,253	5.4	-65,148	5.0		-104,122	3.3		-94,329	3.3		-65,844	5.0	
15	49.2	39.0	-44,330	5.5	-53,224	5.0		-90,848	3.3		-88,450	3.3		-53,307	5.0	
16	49.5	39.1	-44,159	5.6	-50,453	5.0		-85,678	3.3		-90,684	3.3		-49,792	5.0	
17	48.8	38.9	-42,824	5.3	-42,584	4.7		-79,647	3.2		-84,470	3.2		-41,905	4.7	
18	47.0	38.5	-48,416	4.5	-36,881	4.0		-80,672	3.1		-85,318	3.1		-37,455	4.0	
19	44.1	37.3	-60,523	3.8	-46,991	3.5		-94,697	2.9		-101,446	2.9		-47,559	3.5	
20	40.5	34.8	-80,012	3.2	-63,742	3.1		-118,151	2.8		-133,133	2.8		-64,278	3.1	
21	36.4	31.2	-121,407	2.8	-120,508	2.7		-169,442	2.7		-193,640	2.7		-121,014	2.7	
22	32.4	27.7	-181,068	2.7	-166,127	2.7		-223,562	2.7		-256,509	2.7		-166,604	2.7	
23	28.8	24.3	-205,632	2.7	-204,563	2.7		-269,024	2.6		-304,043	2.6		-205,013	2.7	
24	25.9	21.7	-230,084	2.6	-229,326	2.6		-306,936	2.6		-339,614	2.6		-229,751	2.6	

February		----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton		Htg Btuh	Clg Ton	
1	31.5	28.3	-225,605	2.6	-191,602	2.6		-192,309	2.6		-250,872	2.6		-281,068	2.6	
2	29.8	26.8	-239,699	2.6	-202,211	2.6		-201,778	2.6		-261,013	2.6		-296,613	2.6	
3	28.3	25.5	-249,508	2.5	-220,934	2.6		-220,508	2.6		-282,305	2.6		-321,679	2.6	
4	27.1	24.4	-284,397	2.5	-230,503	2.6		-230,084	2.6		-299,103	2.5		-337,884	2.5	
5	26.2	23.6	-324,182	2.5	-239,559	2.5		-289,534	2.5		-314,406	2.5		-350,622	2.5	
6	25.6	23.5	-325,637	2.5	-268,970	2.5		-305,434	2.5		-329,103	2.5		-362,929	2.5	
7	25.5	23.4	-318,363	2.5	-309,571	2.5		-309,175	2.5		-335,258	2.5		-366,858	2.5	
8	26.2	24.4	-230,181	3.1	-233,617	3.1		-309,096	2.5		-335,701	2.5		-287,355	3.1	
9	28.3	26.1	-192,253	3.6	-201,388	3.6		-293,148	2.6		-317,220	2.6		-245,530	3.6	
10	31.5	28.7	-159,351	4.2	-175,883	4.2		-263,625	2.7		-282,804	2.7		-206,036	4.2	
11	35.2	31.3	-116,768	4.9	-138,942	4.7		-221,877	2.9		-203,310	2.8		-151,633	4.7	
12	39.0	33.9	-87,150	5.0	-106,413	4.8		-176,412	3.0		-146,031	3.0		-118,641	4.8	
13	42.2	35.9	-64,106	5.2	-84,268	4.8		-144,151	3.1		-137,526	3.1		-96,051	4.8	
14	44.3	36.9	-52,426	5.4	-69,415	5.0		-121,095	3.2		-114,161	3.2		-80,664	5.0	
15	45.0	36.8	-44,581	5.5	-65,931	5.0		-113,056	3.3		-113,418	3.3		-73,698	5.0	
16	44.8	36.3	-45,922	5.6	-62,069	5.1		-106,048	3.3		-113,718	3.3		-68,336	5.1	
17	44.3	35.8	-40,871	5.3	-57,346	4.8		-104,854	3.3		-112,247	3.3		-63,015	4.8	
18	43.4	35.6	-40,594	4.5	-49,637	4.1		-100,289	3.1		-107,417	3.1		-56,306	4.1	
19	42.2	36.1	-49,348	3.9	-43,081	3.6		-99,318	3.0		-106,190	3.0		-52,190	3.6	
20	40.7	35.9	-66,342	3.2	-81,753	3.1		-113,923	2.8		-120,548	2.8		-91,074	3.1	
21	39.0	34.5	-118,253	2.8	-100,558	2.8		-152,259	2.7		-163,640	2.7		-109,541	2.8	
22	37.1	33.2	-158,613	2.8	-123,521	2.7		-180,493	2.7		-197,180	2.7		-132,180	2.7	
23	35.2	31.5	-180,459	2.7	-146,735	2.7		-202,775	2.7		-224,625	2.7		-155,081	2.7	
24	33.3	29.9	-203,265	2.6	-172,462	2.7		-228,667	2.6		-255,474	2.6		-180,506	2.7	

Trane Air Conditioning Economics  
By: Trane Customer Direct Service Network

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

March		----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----		
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	40.0	36.8	-171,300	2.7	-80,869	2.8	-109,291	2.8	-132,081	2.7	-137,818	2.7
2	37.3	34.5	-184,232	2.7	-107,106	2.7	-143,368	2.7	-171,276	2.7	-177,914	2.7
3	34.9	32.2	-199,888	2.6	-160,770	2.7	-160,186	2.7	-211,996	2.7	-218,396	2.7
4	32.9	30.3	-206,885	2.6	-176,033	2.7	-175,474	2.6	-229,527	2.6	-238,917	2.6
5	31.4	28.8	-247,414	2.6	-198,000	2.6	-197,451	2.6	-257,496	2.6	-272,014	2.6
6	30.4	28.0	-263,610	2.6	-206,174	2.6	-205,639	2.6	-266,655	2.6	-284,978	2.6
7	30.1	27.6	-256,421	2.5	-211,139	2.6	-210,624	2.6	-272,234	2.6	-292,797	2.6
8	30.7	28.0	-160,751	3.2	-181,216	3.2	-212,769	2.6	-270,863	2.6	-213,709	3.2
9	32.5	28.9	-126,600	3.7	-166,888	3.7	-206,219	2.6	-259,145	2.6	-188,808	3.7
10	35.4	30.6	-84,993	4.3	-141,094	4.2	-207,867	2.7	-232,228	2.7	-156,271	4.2
11	38.9	32.6	-54,572	4.9	-106,664	4.7	-184,433	2.9	-163,071	2.9	-121,289	4.7
12	42.9	35.4	-32,580	5.1	-80,679	4.8	-136,488	3.1	-107,159	3.1	-95,171	4.8
13	46.8	38.5	-18,243	5.2	-59,026	4.9	-99,006	3.2	-92,972	3.2	-66,347	4.9
14	50.4	41.3	-4,597	5.4	-45,502	5.1	-72,343	3.3	-60,759	3.3	-45,502	5.1
15	53.2	43.6	0	5.5	-30,894	5.1	-51,585	3.4	-43,990	3.4	-30,894	5.1
16	55.0	45.1	0	5.5	-25,191	5.1	-42,070	3.3	-42,070	3.3	-25,191	5.1
17	55.6	45.4	0	5.3	-16,888	4.8	-31,239	3.3	-31,239	3.3	-16,888	4.8
18	55.3	45.9	0	4.6	-3,986	4.1	-21,797	3.2	-21,797	3.2	-3,986	4.1
19	54.4	46.1	0	4.0	0	3.6	-22,958	3.0	-22,958	3.0	0	3.6
20	52.8	46.3	-18,709	3.4	-5,417	3.2	-28,473	2.9	-28,473	2.9	-5,417	3.2
21	50.8	45.5	-30,999	3.0	-10,706	2.9	-38,849	2.9	-42,100	2.8	-10,706	2.9
22	48.4	43.7	-53,777	2.9	-30,270	2.8	-63,729	2.8	-71,121	2.8	-30,270	2.8
23	45.7	41.6	-79,412	2.8	-45,293	2.8	-82,919	2.8	-90,326	2.8	-48,770	2.8
24	42.9	39.2	-94,152	2.8	-58,402	2.8	-105,113	2.8	-112,255	2.8	-68,947	2.8

		----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----		
April			Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
Hour	OADB	OAWB										
			-16,845	3.0	0	2.9	0	2.9	0	2.9	0	2.9
1	56.3	50.9			0	2.9	0	2.9	0	2.9	0	2.9
2	54.2	48.9	-30,095	2.9	0	2.9	0	2.9	0	2.9	0	2.9
3	52.3	47.7	-40,895	2.9	0	2.9	0	2.9	0	2.9	0	2.9
4	50.7	46.4	-48,901	2.9	0	2.9	0	2.9	0	2.9	0	2.9
5	49.5	45.4	-53,514	2.8	0	2.8	0	2.8	0	2.8	-3,232	2.8
6	48.8	44.7	-52,189	2.8	0	2.8	0	2.8	0	2.8	-4,826	2.8
7	48.5	44.7	-33,951	3.4	0	3.4	0	2.8	-4,407	2.8	-5,413	3.4
8	49.2	44.5	-25,363	3.9	0	3.8	-23,092	2.8	-42,363	2.8	-31,759	3.8
9	51.2	44.6	-12,471	4.3	-21,424	4.3	-35,243	2.8	-35,243	2.8	-35,123	4.3
10	54.2	46.1	0	4.8	-23,600	4.8	-23,736	2.9	0	2.9	-23,600	4.8
11	57.8	48.8	0	4.9	-9,916	4.8	-9,970	3.1	0	3.1	-9,916	4.8
12	61.8	51.6	0	5.1	0	4.9	0	3.2	0	3.2	0	4.9
13	65.4	54.4	0	5.3	0	5.1	0	3.3	0	3.3	0	5.1
14	68.4	56.7	0	5.4	0	5.2	0	3.4	0	3.4	0	5.2
15	70.4	58.3	0	5.5	0	5.2	0	3.4	0	3.4	0	5.2
16	71.0	58.2	0	5.3	0	4.9	0	3.4	0	3.4	0	4.9
17	70.8	58.5	0	4.8	0	4.4	0	3.4	0	3.4	0	4.4
18	70.1	58.2	0	4.3	0	3.9	0	3.3	0	3.3	0	3.9
19	68.9	58.3	0	3.7	0	3.4	0	3.2	0	3.1	0	3.4
20	67.3	58.5	0	3.3	0	3.1	0	3.1	0	3.1	0	3.1
21	65.4	57.9	0	3.2	0	3.0	0	3.0	0	3.0	0	3.0
22	63.3	56.3	0	3.1	0	3.0	0	3.0	0	3.0	0	3.0
23	61.0	54.8	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0
24	58.6	53.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

May			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	63.3	59.6	0	40.9		0	3.9		0	3.9		0	3.9		0	3.9	
2	61.3	57.9	0	37.3		0	3.0		0	3.0		0	3.0		0	3.0	
3	59.7	56.5	0	30.8		0	3.0		0	3.0		0	3.0		0	3.0	
4	58.4	55.5	0	18.8		0	2.9		0	2.9		0	2.9		0	2.9	
5	57.6	54.8	0	18.3		0	2.9		0	2.9		0	2.9		0	2.9	
6	57.4	54.7	0	16.1		0	2.9		0	2.9		0	2.9		0	4.3	
7	57.9	55.2	0	19.7		0	4.3		0	2.9		0	2.9		0	9.3	
8	59.4	55.6	0	26.3		0	9.3		0	2.9		0	2.9		0	17.4	
9	61.7	56.5	0	51.4		0	17.4		0	3.0		0	3.0		0	28.1	
10	64.6	57.7	0	58.8		0	28.1		0	3.0		0	3.0		0	50.6	
11	67.8	59.7	0	59.5		0	50.6		0	3.1		0	3.1		0	52.7	
12	71.0	62.0	0	62.7		0	52.7		0	5.2		0	5.2		0	58.5	
13	73.9	63.9	0	69.2		0	58.5		0	15.1		0	15.1		0	62.8	
14	76.3	65.3	0	73.8		0	62.8		0	19.8		0	19.8		0	66.2	
15	77.7	66.4	0	81.6		0	66.2		0	22.6		0	24.3		0	61.5	
16	78.2	66.4	0	76.5		0	61.5		0	23.6		0	27.6		0	55.4	
17	78.0	66.3	0	65.2		0	55.3		0	28.0		0	29.1		0	50.1	
18	77.2	66.2	0	56.9		0	50.1		0	27.7		0	27.6		0	34.3	
19	76.0	66.5	0	47.9		0	34.3		0	24.3		0	24.3		0	22.3	
20	74.3	66.4	0	39.9		0	22.3		0	21.5		0	21.5		0	18.0	
21	72.3	66.5	0	27.7		0	18.0		0	17.3		0	17.3		0	12.3	
22	70.1	64.9	0	11.2		0	12.3		0	11.8		0	11.8		0	7.5	
23	67.8	63.2	0	5.7		0	7.5		0	7.2		0	7.2		0	4.8	
24	65.5	61.4	0	4.5		0	4.8		0	4.8		0	4.8		0		

June			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	66.2	65.3	0	8.4		0	4.0		0	4.0		0	4.0		0	4.0	
2	65.3	63.9	0	6.0		0	3.0		0	3.0		0	3.0		0	3.0	
3	64.5	62.4	0	4.3		0	3.0		0	3.0		0	3.0		0	3.0	
4	64.0	61.3	0	3.3		0	3.0		0	3.0		0	3.0		0	3.0	
5	63.8	60.8	0	3.2		0	3.0		0	3.0		0	3.0		0	2.9	
6	64.2	61.2	0	3.4		0	2.9		0	2.9		0	2.9		0	15.8	
7	65.1	61.7	0	29.9		0	15.7		0	3.0		0	3.0		0	39.2	
8	66.8	62.3	0	47.2		0	38.8		0	3.0		0	3.0		0	54.4	
9	69.3	63.3	0	61.9		0	54.1		0	3.1		0	3.1		0	65.8	
10	72.1	65.2	0	75.3		0	65.8		0	6.2		0	6.2		0	68.1	
11	75.4	67.5	0	79.6		0	68.1		0	9.9		0	13.7		0	72.2	
12	78.4	69.8	0	85.3		0	72.3		0	27.7		0	34.7		0	88.8	
13	80.7	71.6	0	94.2		0	88.8		0	45.1		0	46.0		0	92.0	
14	82.2	72.7	0	100.6		0	92.0		0	47.7		0	48.6		0	95.6	
15	82.8	72.8	0	105.4		0	95.6		0	51.5		0	51.4		0	89.4	
16	82.2	73.1	0	99.6		0	89.4		0	51.6		0	51.6		0	76.8	
17	80.9	72.7	0	86.1		0	76.8		0	49.7		0	49.7		0	67.5	
18	78.8	71.6	0	76.6		0	67.5		0	44.5		0	44.5		0	55.9	
19	76.3	71.3	0	67.4		0	55.9		0	36.2		0	36.2		0	34.1	
20	73.8	72.0	0	59.3		0	34.1		0	30.1		0	30.1		0	23.0	
21	71.8	71.8	0	42.0		0	23.0		0	22.3		0	22.3		0	16.2	
22	69.9	71.0	0	27.0		0	16.2		0	15.6		0	15.6		0	9.0	
23	68.3	68.9	0	19.1		0	9.0		0	8.6		0	8.6		0	5.1	
24	67.2	66.8	0	12.0		0	5.1		0	5.1		0	5.1		0		



Trane Air Conditioning Economics  
By: Trane Customer Direct Service Network

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

		----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
July																
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	70.9	71.0	0	21.4	0	12.7	0	12.6	0	12.6	0	12.6	0	12.6	0	12.6
2	69.8	68.8	0	17.7	0	9.2	0	9.2	0	9.2	0	9.2	0	9.2	0	9.2
3	68.9	67.0	0	14.4	0	6.8	0	6.8	0	6.8	0	6.8	0	6.8	0	6.8
4	68.2	65.9	0	11.5	0	5.7	0	5.7	0	5.7	0	5.7	0	5.7	0	5.7
5	68.0	65.2	0	10.1	0	4.2	0	4.2	0	4.2	0	4.2	0	4.2	0	4.2
6	68.4	64.9	0	9.7	0	4.3	0	4.2	0	4.2	0	4.2	0	4.2	0	4.3
7	69.6	65.3	0	45.4	0	34.6	0	5.5	0	5.5	0	5.5	0	5.5	0	34.5
8	71.6	65.6	0	59.9	0	50.0	0	7.7	0	7.7	0	7.7	0	7.7	0	49.9
9	74.5	65.7	0	75.0	0	65.3	0	14.9	0	14.9	0	14.9	0	14.9	0	65.3
10	77.9	66.5	0	85.3	0	78.5	0	27.6	0	31.6	0	31.6	0	31.6	0	78.5
11	81.7	67.9	0	89.7	0	80.9	0	37.2	0	41.7	0	41.7	0	41.7	0	80.9
12	85.3	69.9	0	96.6	0	87.4	0	47.1	0	48.7	0	48.7	0	48.7	0	87.4
13	88.0	71.3	0	106.2	0	98.5	0	57.0	0	58.6	0	58.6	0	58.6	0	98.5
14	89.8	72.5	0	111.4	0	102.4	0	60.6	0	61.2	0	61.2	0	61.2	0	102.4
15	90.5	73.9	0	114.3	0	105.2	0	63.7	0	63.7	0	63.7	0	63.7	0	105.2
16	89.8	75.3	0	109.1	0	100.1	0	64.5	0	64.5	0	64.5	0	64.5	0	100.1
17	88.2	75.5	0	95.8	0	86.1	0	60.9	0	60.9	0	60.9	0	60.9	0	86.1
18	85.8	76.2	0	87.5	0	75.2	0	55.3	0	55.3	0	55.3	0	55.3	0	75.2
19	82.8	76.7	0	75.6	0	65.1	0	48.0	0	48.0	0	48.0	0	48.0	0	65.1
20	79.9	78.6	0	71.6	0	58.4	0	42.3	0	42.3	0	42.3	0	42.3	0	58.4
21	77.4	78.8	0	65.2	0	36.7	0	35.9	0	35.9	0	35.9	0	35.9	0	36.7
22	75.2	78.0	0	44.7	0	30.0	0	29.7	0	29.7	0	29.7	0	29.7	0	30.0
23	73.4	75.4	0	32.8	0	22.2	0	21.9	0	21.9	0	21.9	0	21.9	0	22.2
24	72.0	73.0	0	26.5	0	16.1	0	16.0	0	16.0	0	16.0	0	16.0	0	16.1

		----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
August																
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	68.0	65.3	0	11.5	0	4.7	0	4.7	0	4.7	0	4.7	0	4.7	0	4.7
2	67.0	63.5	0	9.1	0	3.3	0	3.3	0	3.3	0	3.3	0	3.3	0	3.3
3	66.2	62.2	0	7.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0
4	65.6	61.1	0	5.4	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0
5	65.4	60.7	0	3.8	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0
6	65.8	60.7	0	4.1	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0
7	66.8	61.2	0	31.2	0	19.6	0	3.0	0	3.0	0	3.0	0	3.0	0	19.6
8	68.6	61.6	0	46.7	0	40.3	0	3.0	0	3.0	0	3.0	0	3.0	0	40.3
9	71.2	62.5	0	62.8	0	53.2	0	3.9	0	3.9	0	3.9	0	3.9	0	53.2
10	74.3	63.6	0	75.3	0	64.2	0	7.0	0	7.0	0	7.0	0	7.0	0	64.2
11	77.7	65.1	0	76.9	0	66.9	0	20.0	0	20.0	0	20.0	0	20.0	0	66.9
12	80.9	66.8	0	83.7	0	75.8	0	34.0	0	34.0	0	34.0	0	34.0	0	75.8
13	83.4	68.2	0	91.9	0	85.2	0	43.0	0	43.0	0	43.0	0	43.0	0	85.2
14	85.0	69.7	0	99.8	0	89.7	0	46.9	0	46.9	0	46.9	0	46.9	0	89.7
15	85.6	70.7	0	103.6	0	93.0	0	50.7	0	50.7	0	50.7	0	50.7	0	93.0
16	85.0	70.5	0	96.4	0	86.6	0	49.9	0	49.9	0	49.9	0	49.9	0	86.6
17	83.6	70.4	0	81.6	0	73.6	0	47.5	0	47.5	0	47.5	0	47.5	0	73.6
18	81.3	70.7	0	73.1	0	63.6	0	42.0	0	42.0	0	42.0	0	42.0	0	63.6
19	78.7	70.7	0	63.2	0	51.8	0	33.2	0	33.2	0	33.2	0	33.2	0	51.8
20	76.1	71.9	0	56.9	0	36.0	0	28.5	0	28.5	0	28.5	0	28.5	0	36.0
21	73.9	72.4	0	43.9	0	22.6	0	22.0	0	22.0	0	22.0	0	22.0	0	22.6
22	71.8	71.1	0	26.2	0	16.4	0	16.0	0	16.0	0	16.0	0	16.0	0	16.4
23	70.2	69.3	0	19.2	0	10.7	0	10.4	0	10.4	0	10.4	0	10.4	0	10.7
24	69.0	67.2	0	16.2	0	8.0	0	7.8	0	7.8	0	7.8	0	7.8	0	8.0

October			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
							0	2.9	0	2.9	0	2.9
1	50.7	45.9	-17,671	2.9	0	2.9	0	2.9	0	2.9	-6,530	2.9
2	48.4	44.0	-20,580	2.9	0	2.9	0	2.9	0	2.9	-11,685	2.8
3	46.3	42.0	-23,075	2.8	-2,226	2.8	0	2.8	-5,972	2.8	-15,934	2.8
4	44.6	40.8	-25,149	2.8	-7,291	2.8	0	2.8	-10,427	2.8	-58,359	2.8
5	43.4	39.7	-25,707	2.8	-39,394	2.8	-30,594	2.8	-68,714	2.8	-81,804	2.8
6	42.6	39.1	-24,766	2.7	-73,780	2.8	-66,989	2.8	-76,686	2.8	-84,576	3.1
7	42.3	38.9	-29,671	3.3	-76,844	3.3	-70,803	2.7	-80,148	2.7	-78,025	3.6
8	43.4	39.8	-66,214	3.8	-70,574	3.8	-66,151	2.8	-75,156	2.8	-63,295	4.3
9	46.3	41.5	-43,141	4.4	-55,753	4.3	-54,178	2.9	-62,231	2.8	-38,885	4.6
10	50.7	43.0	-19,810	4.9	-38,885	4.8	-39,027	3.0	-8,780	3.0	-20,888	4.6
11	56.0	45.7	0	5.1	-20,888	4.9	-20,923	3.2	0	3.2	0	5.1
12	61.2	49.1	0	5.4	0	5.0	0	3.3	0	3.3	0	5.1
13	65.6	52.3	0	5.6	0	5.2	0	3.5	0	3.5	0	5.1
14	68.5	54.1	0	5.8	0	5.3	0	3.6	0	3.6	0	5.1
15	69.6	54.8	0	5.9	0	5.4	0	3.6	0	3.6	0	5.1
16	69.3	54.0	0	5.6	0	5.1	0	3.6	0	3.6	0	5.1
17	68.5	54.2	0	4.9	0	4.4	0	3.5	0	3.5	0	4.6
18	67.3	54.6	0	4.3	0	3.9	0	3.3	0	3.3	0	3.6
19	65.6	55.9	0	3.7	0	3.4	0	3.2	0	3.2	0	3.6
20	63.5	55.7	0	3.2	0	3.1	0	3.1	0	3.1	0	3.6
21	61.2	54.5	0	3.1	0	3.0	0	3.0	0	3.0	0	3.6
22	58.6	52.4	0	3.0	0	3.0	0	3.0	0	3.0	0	3.6
23	56.0	50.0	0	3.0	0	3.0	0	2.9	0	2.9	0	3.6
24	53.3	48.0	0	2.9	0	2.9	0	2.9	0	2.9	0	2.9

October			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	50.7	45.9	-17,671	2.9	0	2.9	0	2.9	0	2.9	0	2.9
2	48.4	44.0	-20,580	2.9	0	2.9	0	2.9	0	2.9	-6,530	2.9
3	46.3	42.0	-23,075	2.8	-2,226	2.8	0	2.8	-5,972	2.8	-11,685	2.8
4	44.6	40.8	-25,149	2.8	-7,291	2.8	0	2.8	-10,427	2.8	-15,934	2.8
5	43.4	39.7	-25,707	2.8	-39,394	2.8	-30,594	2.8	-68,714	2.8	-58,359	2.8
6	42.6	39.1	-24,766	2.7	-73,780	2.8	-66,989	2.8	-76,686	2.8	-81,804	2.8
7	42.3	38.9	-29,671	3.3	-76,844	3.3	-70,803	2.7	-80,148	2.7	-84,576	3.3
8	43.4	39.8	-66,214	3.8	-70,574	3.8	-66,151	2.8	-75,155	2.8	-78,025	3.8
9	46.3	41.5	-43,141	4.4	-55,753	4.3	-54,178	2.9	-62,231	2.8	-63,295	4.3
10	50.7	43.0	-19,810	4.9	-38,885	4.8	-39,027	3.0	-8,780	3.0	-38,885	4.8
11	56.0	45.7	0	5.1	-20,888	4.9	-20,923	3.2	0	3.2	-20,888	4.9
12	61.2	49.1	0	5.4	0	5.0	0	3.3	0	3.3	0	5.0
13	65.6	52.3	0	5.6	0	5.2	0	3.5	0	3.5	0	5.2
14	68.5	54.1	0	5.8	0	5.3	0	3.6	0	3.6	0	5.3
15	69.6	54.8	0	5.9	0	5.4	0	3.6	0	3.6	0	5.4
16	69.3	54.0	0	5.6	0	5.1	0	3.6	0	3.6	0	5.1
17	68.5	54.2	0	4.9	0	4.4	0	3.5	0	3.5	0	4.4
18	67.3	54.6	0	4.3	0	3.9	0	3.3	0	3.3	0	3.9
19	65.6	55.9	0	3.7	0	3.4	0	3.2	0	3.2	0	3.4
20	63.5	55.7	0	3.2	0	3.1	0	3.1	0	3.1	0	3.1
21	61.2	54.5	0	3.1	0	3.0	0	3.0	0	3.0	0	3.0
22	58.6	52.4	0	3.0	0	3.0	0	3.0	0	3.0	0	3.0
23	56.0	50.0	0	3.0	0	3.0	0	2.9	0	2.9	0	3.0
24	53.3	48.0	0	2.9	0	2.9	0	2.9	0	2.9	0	2.9

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

November		----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	43.8 40.3	-1,799	2.8	-55,282	2.8	-56,430	2.8	-95,877	2.8	-102,505	2.8
2	42.0 38.9	-5,719	2.8	-66,783	2.8	-68,308	2.8	-112,699	2.8	-120,195	2.8
3	40.5 37.5	-23,128	2.7	-77,182	2.7	-77,546	2.7	-123,602	2.7	-130,829	2.7
4	39.4 36.3	-90,537	2.7	-84,945	2.7	-85,288	2.7	-135,936	2.7	-142,903	2.7
5	38.7 35.8	-92,896	2.7	-94,134	2.7	-94,456	2.7	-146,171	2.7	-154,632	2.7
6	38.4 35.6	-95,891	2.7	-97,557	2.7	-136,054	2.7	-150,300	2.7	-187,004	2.7
7	39.1 36.3	-90,820	2.6	-94,730	2.7	-135,973	2.7	-148,697	2.7	-187,601	2.7
8	41.0 38.2	-79,929	3.3	-85,815	3.3	-126,053	2.7	-138,311	2.7	-112,446	3.3
9	43.8 40.6	-63,990	3.8	-74,869	3.8	-113,686	2.8	-125,497	2.8	-92,733	3.8
10	47.3 42.8	-48,668	4.5	-60,577	4.4	-93,709	2.9	-104,476	2.9	-73,570	4.4
11	51.1 45.4	-33,073	5.2	-42,768	4.9	-68,963	3.1	-40,541	3.1	-45,825	4.9
12	54.6 47.5	-13,470	5.4	-29,777	5.0	-48,907	3.3	-19,144	3.3	-29,777	5.0
13	57.4 49.2	0	5.5	-19,129	5.1	-32,102	3.4	-12,989	3.4	-19,129	5.1
14	59.3 50.0	0	5.7	-7,889	5.2	-16,418	3.5	-8,504	3.5	-7,889	5.2
15	59.9 50.3	0	5.8	-4,468	5.2	-7,103	3.5	-2,607	3.5	-4,468	5.2
16	59.7 50.1	0	5.7	0	5.2	0	3.5	0	3.5	0	5.2
17	59.0 50.0	0	5.3	0	4.8	-2,721	3.3	-2,721	3.3	0	4.8
18	57.9 50.8	0	4.5	0	4.1	0	3.2	0	3.2	0	4.1
19	56.4 51.0	0	3.9	0	3.6	-4,939	3.0	-4,939	3.0	0	3.6
20	54.6 49.7	0	3.3	0	3.2	-8,488	2.9	-8,488	2.9	0	3.2
21	52.5 48.2	0	2.9	0	2.9	-14,358	2.9	-9,855	2.9	0	2.9
22	50.3 46.2	0	2.9	0	2.9	-41,557	2.9	-43,146	2.9	0	2.9
23	48.1 44.0	-21,041	2.9	-26,243	2.8	-57,514	2.8	-65,700	2.8	-26,243	2.8
24	45.9 42.4	-52,225	2.8	-44,352	2.8	-78,366	2.8	-86,434	2.8	-48,499	2.8

December		----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	32.1 29.4	-162,594	2.6	-188,844	2.6	-190,233	2.6	-248,377	2.6	-281,066	2.6
2	30.2 27.8	-170,539	2.5	-210,102	2.6	-210,327	2.6	-271,173	2.6	-309,597	2.6
3	28.5 25.9	-227,364	2.5	-223,171	2.6	-223,382	2.6	-286,059	2.6	-328,448	2.6
4	27.1 24.9	-262,084	2.5	-236,883	2.6	-270,524	2.6	-309,226	2.5	-350,091	2.5
5	26.1 24.0	-264,882	2.5	-249,496	2.5	-302,535	2.5	-324,012	2.5	-362,170	2.5
6	25.4 23.6	-263,424	2.5	-319,133	2.5	-319,305	2.5	-344,575	2.5	-380,211	2.5
7	25.2 23.3	-261,128	2.5	-323,921	2.5	-324,080	2.5	-351,859	2.5	-385,145	2.5
8	25.8 24.0	-220,512	3.1	-248,603	3.1	-324,472	2.5	-353,007	2.5	-306,390	3.1
9	27.5 25.7	-193,734	3.6	-215,280	3.6	-310,332	2.6	-337,249	2.6	-264,269	3.6
10	30.2 27.9	-161,931	4.2	-186,725	4.2	-281,811	2.7	-304,826	2.7	-222,592	4.2
11	33.4 30.3	-124,633	4.9	-158,305	4.7	-247,310	2.9	-233,556	2.9	-177,995	4.7
12	36.9 32.7	-88,588	5.1	-133,077	4.8	-210,759	3.0	-183,524	3.0	-146,097	4.8
13	40.2 35.1	-70,015	5.3	-108,163	4.8	-175,761	3.2	-169,350	3.2	-120,712	4.8
14	42.8 36.9	-55,944	5.5	-80,041	5.0	-136,776	3.2	-130,049	3.2	-92,137	5.0
15	44.6 38.1	-52,420	5.5	-70,366	5.0	-123,815	3.3	-124,378	3.3	-80,341	5.0
16	45.2 38.5	-50,258	5.5	-66,022	5.0	-114,271	3.3	-122,134	3.3	-72,805	5.0
17	44.9 38.7	-50,681	5.1	-56,723	4.6	-105,016	3.1	-112,597	3.1	-62,631	4.6
18	44.3 39.6	-46,361	4.3	-47,759	3.9	-101,221	3.0	-108,531	3.0	-54,227	3.9
19	43.3 39.6	-54,367	3.7	-64,445	3.5	-109,561	2.9	-116,608	2.8	-73,108	3.5
20	41.9 38.6	-108,005	3.1	-83,719	3.0	-137,401	2.7	-145,454	2.7	-94,148	3.0
21	40.2 37.1	-137,449	2.8	-98,286	2.7	-152,005	2.7	-165,060	2.7	-107,867	2.7
22	38.3 35.3	-169,608	2.7	-130,884	2.7	-188,984	2.7	-207,292	2.7	-140,121	2.7
23	36.2 33.4	-190,629	2.7	-151,651	2.7	-207,932	2.7	-231,685	2.7	-160,556	2.7
24	34.1 31.4	-206,169	2.6	-171,149	2.7	-227,493	2.6	-256,446	2.6	-179,735	2.7

Trane Air Conditioning Economics  
By: Trane Customer Direct Service Network

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----								
----- Room Number -----								
Temperature								
Range	1	2	3	4	5	6	7	
(F)								
Max. Temp.	90.0	75.0	82.2	84.4	85.8	80.3	75.0	
Mo./Hr.	4 18	1 3	4 17	4 17	8 16	4 17	5 17	
Day Type	2	1	2	2	2	2	1	
..... Number of Hours .....								
Above 100	0	0	0	0	0	0	0	
95 - 100	0	0	0	0	0	0	0	
90 - 95	0	0	0	0	0	0	0	
85 - 90	1,027	0	0	0	450	0	0	
80 - 85	2,372	0	354	2,616	2,323	112	0	
75 - 80	2,273	0	1,440	2,472	1,323	4,645	0	
70 - 75	3,088	8,760	5,987	3,672	1,942	4,003	4,873	
65 - 70	0	0	979	0	2,722	0	3,887	
60 - 65	0	0	0	0	0	0	0	
55 - 60	0	0	0	0	0	0	0	
50 - 55	0	0	0	0	0	0	0	
Below 50	0	0	0	0	0	0	0	
Min. Temp.	70.2	72.5	70.0	70.2	70.0	70.1	69.9	
Mo./Br.	1 1	1 1	1 1	1 1	1 1	1 1	1 1	
Day Type	1	1	1	1	1	1	1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1

BLDG 2100 OA NIGHTIME FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	85,309	248	716	4
Feb	76,603	248	581	4
March	86,696	255	245	2
April	78,510	255	0	0
May	109,972	370	0	0
June	119,685	421	0	0
July	129,180	442	0	0
Aug	125,659	424	0	0
Sept	104,464	379	0	0
Oct	83,686	255	0	0
Nov	79,024	255	0	0
Dec	83,288	248	739	4
Total	1,162,077	442	2,281	4

Building Energy Consumption = 56,082 (Btu/Sq Ft/Year)  
Source Energy Consumption = 162,321 (Btu/Sq Ft/Year)

Floor Area = 74,789 (Sq Ft)

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	85,959	248	1,633	6
Feb	77,949	248	1,429	5
March	88,280	255	870	4
April	78,855	255	0	1
May	108,962	368	0	0
June	118,996	421	0	0
July	131,786	442	0	0
Aug	124,928	424	0	0
Sept	103,152	379	0	0
Oct	84,780	255	117	1
Nov	81,185	255	398	2
Dec	84,575	248	1,700	5
Total	1,169,408	442	6,147	6

Building Energy Consumption = 61,586 (Btu/Sq Ft/Year)  
Source Energy Consumption = 168,766 (Btu/Sq Ft/Year)

Floor Area = 74,789 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

----- E Q U I P M E N T E N E R G Y C O N S U M P T I O N -----

Ref	Equip Num Code	----- Monthly Consumption -----												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													266,597
	ELEC	22374	20222	23744	21406	23059	22798	21667	23744	21406	23059	21451	21667	85.3
	PK	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	
1	MISC LD													428,839
	ELEC	36048	32590	37903	34586	36976	36441	35121	37903	34586	36976	34586	35121	117.3
	PK	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	
2	MISC LD													0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	MISC LD													0
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	MISC LD													0
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	MISC LD													0
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	MISC LD													0
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ1100L													126,768
	ELEC	0	0	0	0	17902	26992	35178	28718	17979	0	0	0	105.0
	PK	0.0	0.0	0.0	0.0	84.0	102.0	105.0	103.9	91.6	0.0	0.0	0.0	
1	EQ5200													12,524
	ELEC	0	0	0	0	1637	2765	3504	2889	1729	0	0	0	11.8
	PK	0.0	0.0	0.0	0.0	9.5	11.8	11.8	11.7	10.6	0.0	0.0	0.0	
1	EQ5001													17,383
	ELEC	0	0	0	0	3051	3422	4729	3595	2587	0	0	0	6.6
	PK	0.0	0.0	0.0	0.0	6.6	6.6	6.6	6.6	6.6	0.0	0.0	0.0	
1	EQ5303													786
	ELEC	0	0	0	0	138	155	214	163	117	0	0	0	0.3
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
2	EQ1100L													2,607
	ELEC	0	0	0	0	0	0	2607	0	0	0	0	0	

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	0.0	65.5	74.3	66.5	0.0	0.0	0.0	0.0	74.3
2 EQ5200	CONDENSER FANS												
ELEC	0	0	0	0	0	0	257	0	0	0	0	0	257
PK	0.0	0.0	0.0	0.0	0.0	6.5	7.2	6.4	0.0	0.0	0.0	0.0	7.2
2 EQ5001	CHILLED WATER PUMP C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5303	CONTROLS												
ELEC	0	0	0	0	9	9	21	9	3	0	0	0	52
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
3 EQ1161	AIR-CLD COND COMP <15 TONS												
ELEC	2872	2612	3005	3010	3224	3348	3662	3540	3186	3151	2935	2850	37,396
PK	11.8	11.8	11.8	11.9	12.8	13.3	14.2	13.6	12.8	11.8	11.8	11.8	14.2
3 EQ5200	CONDENSER FANS												
ELEC	112	97	131	198	270	307	350	331	272	192	146	106	2,511
PK	0.3	0.3	0.4	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.5	0.3	0.8
3 EQ5303	CONTROLS												
ELEC	223	202	223	216	223	216	223	223	216	223	216	223	2,628
PK	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	3659	3873	4305	4191	3096	0	0	0	19,124
PK	0.0	0.0	0.0	0.0	13.1	13.1	13.1	13.1	13.1	0.0	0.0	0.0	13.1
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	990	894	990	958	990	958	990	990	958	990	958	990	11,651
PK	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
2 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	32,675
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	65,350
PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	1726	1948	2397	2293	1693	0	0	0	10,056
PK	0.0	0.0	0.0	0.0	11.2	10.1	11.0	11.2	11.2	0.0	0.0	0.0	11.2
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	486	439	486	470	486	470	486	486	470	486	470	486	5,720
PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
5 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	4163	3760	4163	4028	0	0	0	0	0	4163	4028	4163	28,467
PK	5.6	5.6	5.6	5.6	5.6	0.0	0.0	0.0	0.0	5.6	5.6	5.6	5.6



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 BASERUN FT LEONARD WOOD

6	EQ4002	BI CENTRIF. FAN C.V.											8,414	
	ELEC	0	0	0	0	1577	1712	2039	1817	1269	0	0	0	9.3
	PK	0.0	0.0	0.0	0.0	9.3	8.8	9.2	8.8	7.9	0.0	0.0	0.0	
6	EQ4003	FC CENTRIF. FAN C.V.											1,897	
	ELEC	161	145	161	156	161	156	161	161	156	161	156	161	0.2
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
7	EQ4002	BI CENTRIF. FAN C.V.											65,350	
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	7.5
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
1	EQ2001	GAS FIRE TUBE HOT WATER											6,147	
	GAS	1633	1429	870	0	0	0	0	0	0	117	398	1700	5.8
	PK	5.8	4.6	3.7	0.7	0.0	0.0	0.0	0.0	0.0	1.1	2.3	4.8	
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											11,630	
	ELEC	2540	2447	1824	112	0	0	0	0	0	615	1380	2712	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	
1	EQ5240	BOILER FORCED DRAFT FAN											7,483	
	ELEC	1634	1574	1174	72	0	0	0	0	0	396	888	1745	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	
1	EQ5307	BOILER CONTROLS											1,559	
	ELEC	340	328	244	15	0	0	0	0	0	83	185	363	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	
2	EQ2001	GAS FIRE TUBE HOT WATER											0	
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	EQ5020	HEAT WATER CIRC. PUMP C.V.											947	
	ELEC	78	60	201	112	0	0	0	0	0	231	201	63	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	
2	EQ5240	BOILER FORCED DRAFT FAN											610	
	ELEC	50	38	130	72	0	0	0	0	0	149	130	41	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	
2	EQ5307	BOILER CONTROLS											127	
	ELEC	10	8	27	15	0	0	0	0	0	31	27	9	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 2100 NIGHT SETBACK FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	84,255	248	1,204	9
Feb	76,238	248	1,141	9
March	86,815	255	755	8
April	78,855	255	0	3
May	107,108	373	0	0
June	117,360	421	0	0
July	125,300	442	0	0
Aug	122,913	424	0	0
Sept	103,147	379	0	0
Oct	84,508	248	123	2
Nov	79,926	255	337	6
Dec	82,579	248	1,373	9
Total	1,149,006	442	4,933	9

Building Energy Consumption = 59,031 (Btu/Sq Ft/Year)  
Source Energy Consumption = 164,264 (Btu/Sq Ft/Year)

Floor Area = 74,789 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 2100 NIGHT SETBACK FT LEONARD WOOD

EQUIPMENT ENERGY CONSUMPTION

Ref	Equip Num Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													266,597
	ELEC	22374	20222	23744	21406	23059	22798	21667	23744	21406	23059	21451	21667	85.3
	PK	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	
1	MISC LD													428,839
	ELEC	36048	32590	37903	34586	36976	36441	35121	37903	34586	36976	34586	35121	117.3
	PK	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	
2	MISC LD													0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	MISC LD													0
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	MISC LD													0
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	MISC LD													0
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	MISC LD													0
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ1100L													110,121
	ELEC	0	0	0	0	14826	24652	27933	26109	16600	0	0	0	105.4
	PK	0.0	0.0	0.0	0.0	87.0	102.0	105.4	103.9	91.6	0.0	0.0	0.0	
1	EQ5200													10,952
	ELEC	0	0	0	0	1390	2506	2835	2630	1592	0	0	0	11.9
	PK	0.0	0.0	0.0	0.0	9.9	11.8	11.9	11.7	10.6	0.0	0.0	0.0	
1	EQ5001													12,203
	ELEC	0	0	0	0	2374	2454	2673	2540	2162	0	0	0	6.6
	PK	0.0	0.0	0.0	0.0	6.6	6.6	6.6	6.6	6.6	0.0	0.0	0.0	
1	EQ5303													552
	ELEC	0	0	0	0	107	111	121	115	98	0	0	0	0.3
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
2	EQ1100L													4,438
	ELEC	0	0	0	0	0	0	4438	0	0	0	0	0	

PK	0.0	0.0	0.0	0.0	0.0	65.5	74.3	66.5	0.0	0.0	0.0	0.0	74.3
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[illegible]

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 2100 NIGHT SETBACK FT LEONARD WOOD

6	EQ4002		BI CENTRIF. FAN C.V.											8,428
	ELEC	0	0	0	0	1565	1743	2013	1843	1263	0	0	0	9.3
	PK	0.0	0.0	0.0	0.0	9.3	8.8	9.3	9.3	7.9	0.0	0.0	0.0	
6	EQ4003		FC CENTRIF. FAN C.V.											1,897
	ELEC	161	145	161	156	161	156	161	161	156	161	156	161	0.2
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
7	EQ4002		BI CENTRIF. FAN C.V.											65,350
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	7.5
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
1	EQ2001		GAS FIRE TUBE HOT WATER											4,933
	GAS	1204	1141	755	0	0	0	0	0	0	123	337	1373	9.5
	PK	9.5	9.3	7.9	3.0	0.0	0.0	0.0	0.0	0.0	1.6	6.0	9.4	
1	EQ5020		HEAT WATER CIRC. PUMP C.V.											6,643
	ELEC	1458	1380	970	112	0	0	0	0	0	578	671	1473	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	
1	EQ5240		BOILER FORCED DRAFT FAN											4,274
	ELEC	938	888	624	72	0	0	0	0	0	372	432	948	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	
1	EQ5307		BOILER CONTROLS											890
	ELEC	195	185	130	15	0	0	0	0	0	78	90	198	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	
2	EQ2001		GAS FIRE TUBE HOT WATER											0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	EQ5020		HEAT WATER CIRC. PUMP C.V.											1,205
	ELEC	201	164	231	112	0	0	0	0	0	116	201	179	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	
2	EQ5240		BOILER FORCED DRAFT FAN											775
	ELEC	130	106	149	72	0	0	0	0	0	74	130	115	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	
2	EQ5307		BOILER CONTROLS											161
	ELEC	27	22	31	15	0	0	0	0	0	15	27	24	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 2100 DDC CONTROL FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	83,287	248	703	9
Feb	75,652	248	702	8
March	86,426	248	403	5
April	78,506	255	0	0
May	103,319	366	0	0
June	113,059	388	0	0
July	119,793	436	0	0
Aug	118,928	391	0	0
Sept	99,000	373	0	0
Oct	83,320	242	0	0
Nov	79,240	255	109	3
Dec	82,164	248	867	8
Total	1,122,695	436	2,784	9

Building Energy Consumption = 54,957 (Btu/Sq Ft/Year)  
Source Energy Consumption = 157,636 (Btu/Sq Ft/Year)

Floor Area = 74,789 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 2100 DDC CONTROL FT LEONARD WOOD

----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	22374	20222	23744	21406	23059	22798	21667	23744	21406	23059	21451	21667	266,597
	PK	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3
1	MISC LD													
	ELEC	36048	32590	37903	34586	36976	36441	35121	37903	34586	36976	34586	35121	428,839
	PK	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1100L	AIR-CLD RECIP >45 TONS												
	ELEC	0	0	0	0	12038	21306	26970	23042	13687	0	0	0	97,043
	PK	0.0	0.0	0.0	0.0	79.4	100.2	106.1	101.9	86.6	0.0	0.0	0.0	106.1
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	1152	2123	2754	2266	1303	0	0	0	9,597
	PK	0.0	0.0	0.0	0.0	8.8	11.4	11.7	11.4	9.9	0.0	0.0	0.0	11.7
1	EQ5001	CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	1844	2374	2560	2514	1791	0	0	0	11,082
	PK	0.0	0.0	0.0	0.0	6.6	6.6	6.6	6.6	6.6	0.0	0.0	0.0	6.6
1	EQ5303	CONTROLS												
	ELEC	0	0	0	0	83	107	116	114	81	0	0	0	501
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1100L	AIR-CLD RECIP >45 TONS												
	ELEC	0	0	0	0	0	0	856	0	0	0	0	0	856

PK	0.0	0.0	0.0	0.0	0.0	0.0	71.4	0.0	0.0	0.0	0.0	0.0	71.4
CONDENSER FANS													
2 EQ5200							65	0	0	0	0	0	65
ELEC	0	0	0	0	0	0	6.8	0.0	0.0	0.0	0.0	0.0	6.8
PK	0.0	0.0	0.0	0.0	0.0	0.0							
CHILLED WATER PUMP C.V.													
2 EQ5001						0	0	0	0	0	0	0	0
ELEC	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PK	0.0	0.0	0.0	0.0	0.0								
CONTROLS													
2 EQ5303					2	2	8	0	8	0	0	0	20
ELEC	0	0	0	0	0.3	0.3	0.3	0.0	0.3	0.0	0.0	0.0	0.3
PK	0.0	0.0	0.0	0.0									
AIR-CLD COND COMP <15 TONS													
3 EQ1161						3354	3680	3546	3198	3193	2976	2891	37,776
ELEC	2911	2654	3052	3056	3265	13.3	14.2	13.6	12.8	11.8	11.8	11.8	14.2
PK	11.8	11.8	11.8	11.9	12.8								
CONDENSER FANS													
3 EQ5200													2,535
ELEC	113	99	133	202	274	308	351	332	274	195	148	107	0.8
PK	0.3	0.3	0.4	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.5	0.3	
CONTROLS													
3 EQ5303													2,628
ELEC	223	202	223	216	223	216	223	223	216	223	216	223	0.3
PK	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
BI CENTRIF. FAN C.V.													
1 EQ4002													18,490
ELEC	0	0	0	0	3860	3743	3914	3990	2982	0	0	0	13.1
PK	0.0	0.0	0.0	0.0	13.1	13.1	13.1	13.1	13.1	0.0	0.0	0.0	
FC CENTRIF. FAN C.V.													
1 EQ4003													11,651
ELEC	990	894	990	958	990	958	990	990	958	990	958	990	1.3
PK	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
FC CENTRIF. FAN C.V.													
2 EQ4003													32,675
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	3.7
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	
BI CENTRIF. FAN C.V.													
3 EQ4002													65,350
ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	7.5
PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
BI CENTRIF. FAN C.V.													
4 EQ4002													9,281
ELEC	0	0	0	0	1643	1790	2222	2108	1518	0	0	0	11.2
PK	0.0	0.0	0.0	0.0	11.2	10.0	11.2	11.1	11.1	0.0	0.0	0.0	
FC CENTRIF. FAN C.V.													
4 EQ4003													5,720
ELEC	486	439	486	470	486	470	486	486	470	486	470	486	0.7
PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
BI CENTRIF. FAN C.V.													
5 EQ4002													37,884
ELEC	4163	3760	4163	4028	1908	1846	1908	1908	1846	4163	4028	4163	5.6
PK	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	



6	EQ4002	BI CENTRIF. FAN C.V.											7,802	
	ELEC	0	0	0	0	1480	1639	1865	1727	1091	0	0	0	
	PK	0.0	0.0	0.0	0.0	9.3	8.6	9.3	8.6	8.0	0.0	0.0	0.0	9.3
6	EQ4003	FC CENTRIF. FAN C.V.											1,897	
	ELEC	161	145	161	156	161	156	161	161	156	161	156	161	0.2
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
7	EQ4002	BI CENTRIF. FAN C.V.											65,350	
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	7.5
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
1	EQ2001	GAS FIRE TUBE HOT WATER											2,784	
	GAS	703	702	403	0	0	0	0	0	0	0	109	867	8.7
	PK	8.7	7.7	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	7.8	
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											4,226	
	ELEC	862	1000	809	0	0	0	0	0	0	0	351	1205	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	3.7	3.7	
1	EQ5240	BOILER FORCED DRAFT FAN											2,719	
	ELEC	554	643	521	0	0	0	0	0	0	0	226	775	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.4	
1	EQ5307	BOILER CONTROLS											567	
	ELEC	116	134	108	0	0	0	0	0	0	0	47	161	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
2	EQ2001	GAS FIRE TUBE HOT WATER											0	
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	EQ5020	HEAT WATER CIRC. PUMP C.V.											869	
	ELEC	231	190	145	0	0	0	0	0	0	0	112	190	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	3.7	3.7	
2	EQ5240	BOILER FORCED DRAFT FAN											559	
	ELEC	149	122	94	0	0	0	0	0	0	0	72	122	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.4	
2	EQ5307	BOILER CONTROLS											117	
	ELEC	31	25	20	0	0	0	0	0	0	0	15	25	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 2100 ECONOMIZER FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	83,287	248	703	9
Feb	75,652	248	702	8
March	86,426	248	403	5
April	78,506	255	0	0
May	102,721	366	0	0
June	112,500	388	0	0
July	119,325	436	0	0
Aug	117,921	391	0	0
Sept	98,116	373	0	0
Oct	83,320	242	0	0
Nov	79,240	255	109	3
Dec	82,164	248	867	8
Total	1,119,179	436	2,784	9

Building Energy Consumption = 54,796 (Btu/Sq Ft/Year)  
Source Energy Consumption = 157,155 (Btu/Sq Ft/Year)

Floor Area = 74,789 (Sq Ft)

## EQUIPMENT ENERGY CONSUMPTION

[illegible]

[illegible]

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 2100 ECONOMIZER FT LEONARD WOOD

6	EQ4002	BI CENTRIF. FAN C.V.											7,802
	ELEC	0	0	0	0	1480	1639	1865	1727	1091	0	0	0
	PK	0.0	0.0	0.0	0.0	9.3	8.6	9.3	8.6	8.0	0.0	0.0	0.0
6	EQ4003	FC CENTRIF. FAN C.V.											1,897
	ELEC	161	145	161	156	161	156	161	161	156	161	156	161
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
7	EQ4002	BI CENTRIF. FAN C.V.											65,350
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1	EQ2001	GAS FIRE TUBE HOT WATER											2,784
	GAS	703	702	403	0	0	0	0	0	0	109	867	8.7
	PK	8.7	7.7	5.4	0.0	0.0	0.0	0.0	0.0	0.0	3.1	7.8	8.7
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											4,226
	ELEC	862	1000	809	0	0	0	0	0	0	351	1205	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7
1	EQ5240	BOILER FORCED DRAFT FAN											2,719
	ELEC	554	643	521	0	0	0	0	0	0	226	775	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4
1	EQ5307	BOILER CONTROLS											567
	ELEC	116	134	108	0	0	0	0	0	0	47	161	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5
2	EQ2001	GAS FIRE TUBE HOT WATER											0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5020	HEAT WATER CIRC. PUMP C.V.											869
	ELEC	231	190	145	0	0	0	0	0	0	112	190	3.7
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7
2	EQ5240	BOILER FORCED DRAFT FAN											559
	ELEC	149	122	94	0	0	0	0	0	0	72	122	2.4
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4
2	EQ5307	BOILER CONTROLS											117
	ELEC	31	25	20	0	0	0	0	0	0	15	25	0.5
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 CA NIGHTIME FT LEONARD WOOD

----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N -----

Ref	Equip Num Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	22374	20222	23744	21406	23059	22798	21667	23744	21406	23059	21451	21667	266,597
	PK	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3	85.3
1	MISC LD													
	ELEC	36048	32590	37903	34586	36976	36441	35121	37903	34586	36976	34586	35121	428,839
	PK	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3	117.3
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1100L													
	AIR-CLD RECIP >45 TONS													
	ELEC	0	0	0	0	18055	26858	32686	28526	18688	0	0	0	124,812
	PK	0.0	0.0	0.0	0.0	85.5	102.0	105.0	103.9	91.6	0.0	0.0	0.0	105.0
1	EQ5200													
	CONDENSER FANS													
	ELEC	0	0	0	0	1625	2686	3184	2815	1771	0	0	0	12,081
	PK	0.0	0.0	0.0	0.0	9.7	11.8	11.8	11.7	10.6	0.0	0.0	0.0	11.8
1	EQ5001													
	CHILLED WATER PUMP C.V.													
	ELEC	0	0	0	0	3873	4271	4934	4543	3117	0	0	0	20,739
	PK	0.0	0.0	0.0	0.0	6.6	6.6	6.6	6.6	6.6	0.0	0.0	0.0	6.6
1	EQ5303													
	CONTROLS													
	ELEC	0	0	0	0	175	193	223	205	141	0	0	0	938
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1100L													
	AIR-CLD RECIP >45 TONS													
	ELEC	0	0	0	0	0	0	2607	0	0	0	0	0	2,607

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 OA NIGHTIME FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	0.0	65.5	74.3	66.5	0.0	0.0	0.0	0.0	74.3
2 EQ5200	CONDENSER FANS												
ELEC	0	0	0	0	0	0	257	0	0	0	0	0	257
PK	0.0	0.0	0.0	0.0	0.0	6.5	7.2	6.4	0.0	0.0	0.0	0.0	7.2
2 EQ5001	CHILLED WATER PUMP C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5303	CONTROLS												
ELEC	0	0	0	0	19	23	12	15	9	0	0	0	78
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
3 EQ1161	AIR-CLD COND COMP <15 TONS												
ELEC	2872	2612	3005	3010	3224	3348	3662	3540	3186	3151	2935	2850	37,396
PK	11.8	11.8	11.8	11.9	12.8	13.3	14.2	13.6	12.8	11.8	11.8	11.8	14.2
3 EQ5200	CONDENSER FANS												
ELEC	112	97	131	198	270	307	350	331	272	192	146	106	2,511
PK	0.3	0.3	0.4	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.5	0.3	0.8
3 EQ5303	CONTROLS												
ELEC	223	202	223	216	223	216	223	223	216	223	216	223	2,628
PK	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	3659	3873	4305	4191	3096	0	0	0	19,124
PK	0.0	0.0	0.0	0.0	13.1	13.1	13.1	13.1	13.1	0.0	0.0	0.0	13.1
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	990	894	990	958	990	958	990	990	958	990	958	990	11,651
PK	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
2 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	32,675
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	65,350
PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	1726	1948	2397	2293	1693	0	0	0	10,056
PK	0.0	0.0	0.0	0.0	11.2	10.1	11.0	11.2	11.2	0.0	0.0	0.0	11.2
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	486	439	486	470	486	470	486	486	470	486	470	486	5,720
PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
5 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	4163	3760	4163	4028	0	0	0	0	0	4163	4028	4163	28,467
PK	5.6	5.6	5.6	5.6	0.0	0.0	0.0	0.0	0.0	5.6	5.6	5.6	5.6

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 2100 OA NIGHTIME FT LEONARD WOOD

6	EQ4002	BI CENTRIF. FAN C.V.											8,414	
	ELEC	0	0	0	0	1577	1712	2039	1817	1269	0	0	0	
	PK	0.0	0.0	0.0	0.0	9.3	8.8	9.2	8.8	7.9	0.0	0.0	0.0	9.3
6	EQ4003	FC CENTRIF. FAN C.V.											1,897	
	ELEC	161	145	161	156	161	156	161	161	156	161	156	161	
	PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
7	EQ4002	BI CENTRIF. FAN C.V.											65,350	
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1	EQ2001	GAS FIRE TUBE HOT WATER											2,281	
	GAS	716	581	245	0	0	0	0	0	0	0	0	739	
	PK	3.6	3.5	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	3.8
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											6,923	
	ELEC	2137	1641	903	15	0	0	0	0	0	116	183	1928	
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7
1	EQ5240	BOILER FORCED DRAFT FAN											4,454	
	ELEC	1375	1056	581	10	0	0	0	0	0	74	118	1241	
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4
1	EQ5307	BOILER CONTROLS											928	
	ELEC	287	220	121	2	0	0	0	0	0	15	25	258	
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
2	EQ2001	GAS FIRE TUBE HOT WATER											0	
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5020	HEAT WATER CIRC. PUMP C.V.											891	
	ELEC	116	108	231	15	0	0	0	0	0	116	183	123	
	PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7
2	EQ5240	BOILER FORCED DRAFT FAN											574	
	ELEC	74	70	149	10	0	0	0	0	0	74	118	79	
	PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	2.4
2	EQ5307	BOILER CONTROLS											119	
	ELEC	15	15	31	2	0	0	0	0	0	15	25	16	
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 2100 OA DAYTIME FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	84,872	255	1,101	5
Feb	76,921	255	858	4
March	87,511	255	513	3
April	78,510	255	0	0
May	108,538	360	0	0
June	117,207	375	0	0
July	127,047	388	0	0
Aug	123,196	379	0	0
Sept	102,625	368	0	0
Oct	84,303	255	58	1
Nov	80,403	255	266	1
Dec	83,693	255	1,031	4
Total	1,154,827	388	3,827	5

Building Energy Consumption = 57,818 (Btu/Sq Ft/Year)  
Source Energy Consumption = 163,504 (Btu/Sq Ft/Year)

Floor Area = 74,789 (Sq Ft)

## ----- EQUIPMENT ENERGY CONSUMPTION

[illegible]

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 2100 OA DAYTIME FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5200	CONDENSER FANS												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5001	CHILLED WATER PUMP C.V.												0
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5303	CONTROLS												37
ELEC	0	0	0	0	9	9	9	9	0	0	0	0	0.3
PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
3 EQ1161	AIR-CLD COND COMP <15 TONS												37,396
ELEC	2872	2612	3005	3010	3224	3348	3662	3540	3186	3151	2935	2850	14.2
PK	11.8	11.8	11.8	11.9	12.8	13.3	14.2	13.6	12.8	11.8	11.8	11.8	14.2
3 EQ5200	CONDENSER FANS												2,511
ELEC	112	97	131	198	270	307	350	331	272	192	146	106	0.8
PK	0.3	0.3	0.4	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.5	0.3	0.8
3 EQ5303	CONTROLS												2,628
ELEC	223	202	223	216	223	216	223	223	216	223	216	223	0.3
PK	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1 EQ4002	BI CENTRIF. FAN C.V.												20,267
ELEC	0	0	0	0	3884	4101	4565	4439	3279	0	0	0	13.1
PK	0.0	0.0	0.0	0.0	13.1	13.1	13.1	13.1	13.1	0.0	0.0	0.0	13.1
1 EQ4003	FC CENTRIF. FAN C.V.												11,651
ELEC	990	894	990	958	990	958	990	990	958	990	958	990	1.3
PK	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
2 EQ4003	FC CENTRIF. FAN C.V.												32,675
ELEC	2775	2507	2775	2686	2775	2686	2775	2775	2686	2775	2686	2775	3.7
PK	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
3 EQ4002	BI CENTRIF. FAN C.V.												65,350
ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	7.5
PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
4 EQ4002	BI CENTRIF. FAN C.V.												10,056
ELEC	0	0	0	0	1726	1948	2397	2293	1693	0	0	0	11.2
PK	0.0	0.0	0.0	0.0	11.2	10.1	11.0	11.2	11.2	0.0	0.0	0.0	11.2
4 EQ4003	FC CENTRIF. FAN C.V.												5,720
ELEC	486	439	486	470	486	470	486	486	470	486	470	486	0.7
PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
5 EQ4002	BI CENTRIF. FAN C.V.												28,467
ELEC	4163	3760	4163	4028	0	0	0	0	0	4163	4028	4163	5.6
PK	5.6	5.6	5.6	5.6	0.0	0.0	0.0	0.0	0.0	5.6	5.6	5.6	5.6

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 2100 OA DAYTIME FT LEONARD WOOD

BI CENTRIF. FAN C.V.													
6 EQ4002					1577	1712	2039	1817	1269	0	0	0	8,414
ELEC	0	0	0	0									9.3
PK	0.0	0.0	0.0	0.0	9.3	8.8	9.2	8.8	7.9	0.0	0.0	0.0	
FC CENTRIF. FAN C.V.													
6 EQ4003					161	156	161	161	156	161	156	161	1,897
ELEC	161	145	161	156									0.2
PK	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
BI CENTRIF. FAN C.V.													
7 EQ4002					5550	5371	5550	5550	5371	5550	5371	5550	65,350
ELEC	5550	5013	5550	5371									7.5
PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
GAS FIRE TUBE HOT WATER													
1 EQ2001					0	0	0	0	0	58	266	1031	3,827
GAS	1101	858	513	0									5.4
PK	5.4	4.1	3.3	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.5	4.4	
HEAT WATER CIRC. PUMP C.V.													
1 EQ5020					0	0	0	0	0	347	1018	2100	8,482
ELEC	1876	1764	1361	15									3.7
PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	
BOILER FORCED DRAFT FAN													
1 EQ5240					0	0	0	0	0	223	655	1351	5,458
ELEC	1207	1135	876	10									2.4
PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	
BOILER CONTROLS													
1 EQ5307					0	0	0	0	0	47	136	281	1,137
ELEC	251	237	183	2									0.5
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	
GAS FIRE TUBE HOT WATER													
2 EQ2001					0	0	0	0	0	0	0	0	0
GAS	0	0	0	0									0.0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
HEAT WATER CIRC. PUMP C.V.													
2 EQ5020					0	0	0	0	0	231	123	179	1,074
ELEC	131	164	231	15									3.7
PK	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0	0.0	3.7	3.7	3.7	
BOILER FORCED DRAFT FAN													
2 EQ5240					0	0	0	0	0	149	79	115	691
ELEC	84	106	149	10									2.4
PK	2.4	2.4	2.4	2.4	0.0	0.0	0.0	0.0	0.0	2.4	2.4	2.4	
BOILER CONTROLS													
2 EQ5307					0	0	0	0	0	31	16	24	144
ELEC	18	22	31	2									0.5
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	

**COMPUTER SIMULATIONS**

**BUILDING 4109**

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 18-Mar-93  
BUILDING NO.: 4109  
BLDG. TYPE: OFFICERS CLUB

**ENERGY CONSTANT CALCULATIONS**

ECC	30000 KWH	—	0 KWH	=	0.00E+00 KWH/CFM—HR
	28820 CFM	*	1952 HR/YR		
ECHO	30000 KWH	—	0 KWH	=	0.00E+00 KWH/CFM—HR
	28820 CFM	*	5840 HR/YR		
NSUCHC	45308 KWH	—	39497 KWH	=	6.91E—05 KWH/CFM—HR
	28820 CFM	*	2920 HR/YR		
NSUC	45308 KWH	—	39497 KWH	=	2.07E—04 KWH/CFM—HR
	28820 CFM	*	976 HR/YR		
DDCCHO	39497 KWH	—	30000 KWH	=	5.64E—05 KWH/CFM—HR
	28820 CFM	*	5840 HR/YR		
DDCCO	39497 KWH	—	30000 KWH	=	1.69E—04 KWH/CFM—HR
	28820 CFM	*	1952 HR/YR		
NSC	792.6 MBtu	—	741.7 MBtu	=	9.68E+03 Btu/UA
	5257 UA				
DSC	741.7 MBtu	—	628.4 MBtu	=	2.16E+04 Btu/UA
	5257 UA				
OPT ( 2 HR/DAY X 272 DAY/YR ) —				294 HR/YR	
				=	250 HR/YR
CHWR (0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)					
				=	13.9 KWH/TON
OAR	506 HR/YR	*	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 01-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z1R1

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 1 (RM 1)

BLDG FUNCTION: PACKAGE STORE / BARBER SHOP

FLOOR AREA: (SQ. FT) 2,187

# FLOORS 1

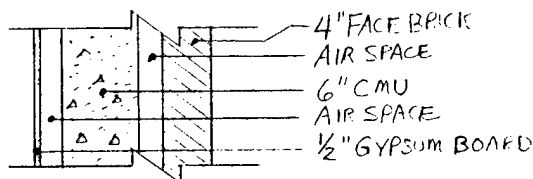
SLAB PERIMETER: (FT) 102

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	743	0	0	635	1,377
GLASS	(SQ. FT)	0	0	0	29	29
PERSONNEL DOOR	(SQ. FT)	0	0	0	22	22
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	743	0	0	584	1,326
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 2,187
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR		(SQ. FT)	22
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

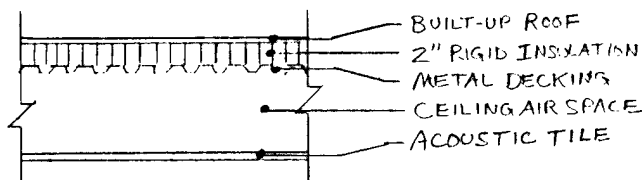
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5. AIR SPACE	0.91
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.44
U=1/R	0.184

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECKING	0.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	10.65
U=1/R	0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1377	X CFM / SQ.FT.	0.115	= 158
LEAKY WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR		X CFM / OPENING / HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	20	X CFM / OPENING / HR	1.385	=	28
TOTAL INFILTRATION (CFM)				=	186

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	22	X DOOR 'U'	0.391	=	9
UA WALL	= WALL AREA	1,326	X WALL 'U'	0.184	=	244
UA ROOF	= ROOF AREA	2,187	X ROOF 'U'	0.094	=	205
UA GLASS	= GLASS AREA	29	X GLASS 'U'	0.621	=	18
UA SLAB	= SLAB PERIM.	102	X SLF	0.670	=	68
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	186	X A. T. F.	1.035	=	193
TOTAL UA (BTU/HR*F)						736

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 01-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z2R2

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 2 (RM 2)

BLDG FUNCTION: ADMINISTRATION OFFICES

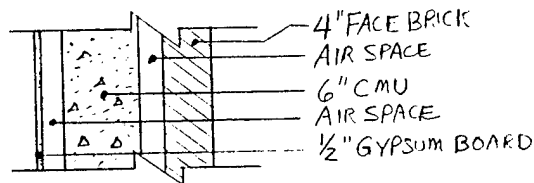
FLOOR AREA: (SQ. FT) 3,420

# FLOORS 1

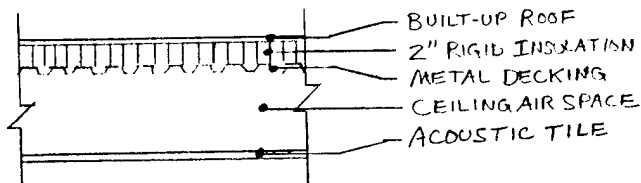
SLAB PERIMETER: (FT) 100

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,350	0	0	0	1,350
GLASS	(SQ. FT)	94	0	0	0	94
PERSONNEL DOOR	(SQ. FT)	44	0	0	0	44
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	1,212	0	0	0	1,212
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					3,420
OVERHEAD DOOR	(SQ. FT)	0				
PERSONNEL DOOR	(SQ. FT)					44
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5. AIR SPACE	0.91
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.44
U=1/R	0.184

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECKING	0.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	10.65
U=1/R	0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1350	X CFM / SQ.FT.	0.115	= 155
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	30		X CFM / OPENING / HR	1.385	= 42
		TOTAL INFILTRATION (CFM)		=	197

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	44	X DOOR 'U'	0.391	=	17
UA WALL	= WALL AREA	1,212	X WALL 'U'	0.184	=	223
UA ROOF	= ROOF AREA	3,420	X ROOF 'U'	0.094	=	321
UA GLASS	= GLASS AREA	94	X GLASS 'U'	0.621	=	58
UA SLAB	= SLAB PERIM.	100	X SLF	0.670	=	67
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	197	X A. T. F.	1.035	=	204

**TOTAL UA (BTU/HR°F) 890**



**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 01-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z3R3

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 3 (RM 3)

BLDG FUNCTION: COCKTAIL LOUNGE

FLOOR AREA: (SQ. FT) 1,200

# FLOORS 1

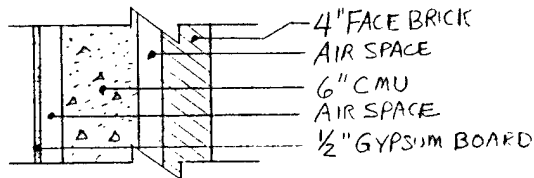
SLAB PERIMETER: (FT) 68

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	459	0	459	0	918
GLASS	(SQ. FT)	54	0	144	0	198
PERSONNEL DOOR	(SQ. FT)	0	0	42	0	42
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	405	0	273	0	678
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 1,200
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR		(SQ. FT)	42
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

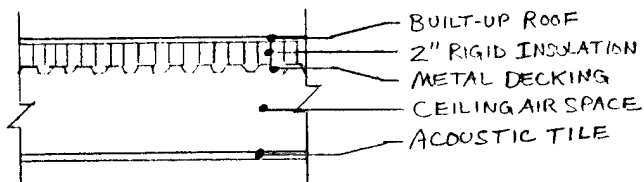
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5. AIR SPACE	0.91
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.44
U=1/R	0.184

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECKING	0.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	10.65
U=1/R	0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	918	X CFM / SQ.FT.	0.115	= 106
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	25		X CFM / OPENING / HR	1.385	= 35
TOTAL INFILTRATION (CFM)				=	140

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	678	X WALL 'U'	0.184	=	125
UA ROOF	= ROOF AREA	1,200	X ROOF 'U'	0.094	=	113
UA GLASS	= GLASS AREA	198	X GLASS 'U'	0.621	=	123
UA SLAB	= SLAB PERIM.	68	X SLF	0.830	=	56
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	140	X A. T. F.	1.035	=	145
TOTAL UA (BTU/HR°F)						578

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 03-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z4R4

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 4 (RM 4)

BLDG FUNCTION: BAR - GAME ROOM

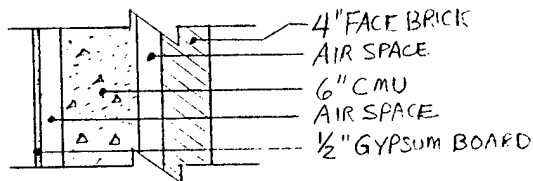
FLOOR AREA: (SQ. FT) 2,444

# FLOORS 1

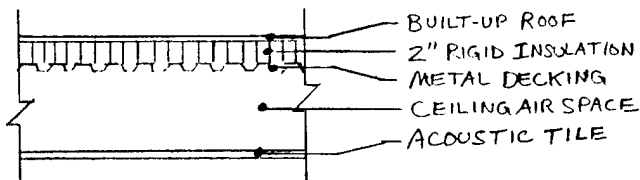
SLAB PERIMETER: (FT) 119

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	635	0	972	1,607
GLASS	(SQ. FT)	0	36	0	72	108
PERSONNEL DOOR	(SQ. FT)	0	42	0	0	42
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	557	0	900	1,457
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					2,444
OVERHEAD DOOR	(SQ. FT)	0				
PERSONNEL DOOR	(SQ. FT)					42
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)****WALLS: (SKETCH CROSS SECTION OF WALL)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5. AIR SPACE	0.91
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.44
U=1/R	0.184

**ROOF: (SKETCH CROSS SECTION OF ROOF)**

COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECKING	0.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	10.65
U=1/R	0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1607	X CFM / SQ.FT.	0.115	= 185
LEAKY WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR		X CFM / OPENING / HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	15	X CFM / OPENING / HR	1.385	=	21
TOTAL INFILTRATION (CFM)				=	206

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	1,457	X WALL 'U'	0.184	=	268
UA ROOF	= ROOF AREA	2,444	X ROOF 'U'	0.094	=	229
UA GLASS	= GLASS AREA	108	X GLASS 'U'	0.621	=	67
UA SLAB	= SLAB PERIM.	119	X SLF	0.670	=	80
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	206	X A. T. F.	1.035	=	213

**TOTAL UA (BTU/HR°F) 873**

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 01-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z4R5

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 4 (RM 5)

BLDG FUNCTION: BALL ROOM

FLOOR AREA: (SQ. FT) 7,015

# FLOORS 1

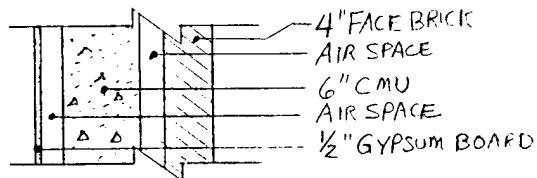
SLAB PERIMETER: (FT) 0

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	0	0	0	0
GLASS	(SQ. FT)	0	0	0	0	0
PERSONNEL DOOR	(SQ. FT)	0	0	0	0	0
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	0	0	0	0
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 7,015
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR		(SQ. FT)	0
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

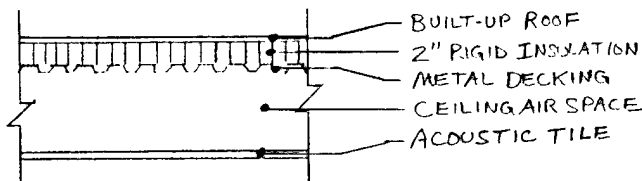
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



	COMPONENTS	R-VALUE
1.		
2.		
3.		
4.		
5.		
6.		
7.		

ROOF: (SKETCH CROSS SECTION OF ROOF)



	COMPONENTS	R-VALUE
1.	OUTSIDE AIR FILM	0.17
2.	BUILT-UP ROOF	0.34
3.	2" RIGID INSULATION	6.68
4.	METAL DECKING	0.00
5.	CEILING AIR SPACE	1.00
6.	ACOUSTIC TILE	1.79
7.	INSIDE AIR FILM	0.68
TOTAL R-ROOF =		10.65
U=1/R		0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)	X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)	X CFM / SQ.FT.	0.000	=	0
DOOR OPENINGS / HR - SINGLE DOOR	X CFM / OPENING / HR	1.600	=	0
DOOR OPENINGS / HR - DOUBLE DOORS	X CFM / OPENING / HR	1.385	=	0
TOTAL INFILTRATION (CFM)			=	0

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	0	X DOOR 'U'	0.391	=	0
UA WALL	= WALL AREA	0	X WALL 'U'	0.000	=	0
UA ROOF	= ROOF AREA	7,015	X ROOF 'U'	0.094	=	658
UA GLASS	= GLASS AREA	0	X GLASS 'U'	0.621	=	0
UA SLAB	= SLAB PERIM.	0	X SLF	0.670	=	0
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	0	X A. T. F.	1.035	=	0

TOTAL UA (BTU/HR°F) 658

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 03-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z4R6

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 4 (RM 6)

BLDG FUNCTION: DINING ROOM

FLOOR AREA: (SQ. FT) 1,840

# FLOORS 1

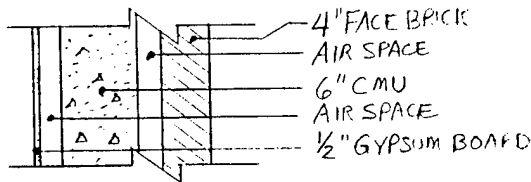
SLAB PERIMETER: (FT) 40

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	0	540	0	540
GLASS	(SQ. FT)	0	0	192	0	192
PERSONNEL DOOR	(SQ. FT)	0	0	42	0	42
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	0	306	0	306
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					1,840
OVERHEAD DOOR	(SQ. FT)	0		PERSONNEL DOOR	(SQ. FT)	42
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

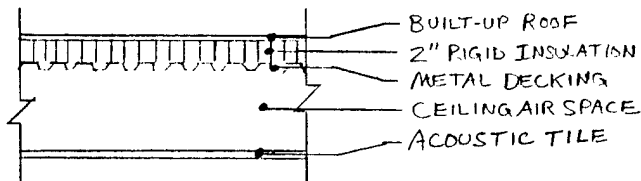
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5. AIR SPACE	0.91
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.44
U=1/R	0.184

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" INSULATION	6.68
4. METAL DECKING	0.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	10.65
U=1/R	0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.67
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	540	X CFM / SQ.FT.	0.115	= 62
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING /HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	35		X CFM / OPENING /HR	1.385	= 48
		TOTAL INFILTRATION (CFM)		=	111

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	42	X DOOR 'U'	0.391	=	16
UA WALL	= WALL AREA	306	X WALL 'U'	0.184	=	56
UA ROOF	= ROOF AREA	1,840	X ROOF 'U'	0.094	=	173
UA GLASS	= GLASS AREA	192	X GLASS 'U'	0.621	=	119
UA SLAB	= SLAB PERIM.	40	X SLF	0.670	=	27
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	111	X A. T. F.	1.035	=	114

**TOTAL UA (BTU/HR°F) 506**

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 01-Mar-93

BY: BHS

JOB: 3204.000

CHK: AJN

FILE: 4109Z4R7

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 4109 BLDG NAME: OFFICERS CLUB - ZONE 4 (RM 7)

BLDG FUNCTION: KITCHEN

FLOOR AREA: (SQ. FT) 3,147

# FLOORS 1

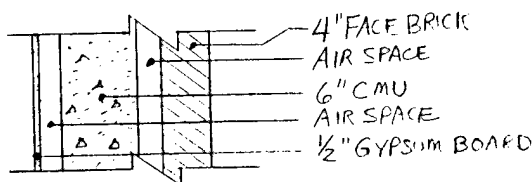
SLAB PERIMETER: (FT) 135

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	1,202	608	0	1,809
GLASS	(SQ. FT)	0	0	0	0	0
PERSONNEL DOOR	(SQ. FT)	0	42	42	0	84
OVERHEAD DOOR	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	1,160	566	0	1,725
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					3,147
OVERHEAD DOOR	(SQ. FT)	0				
PERSONNEL DOOR	(SQ. FT)					84
BASEMENT WALLS	(SQ. FT)	0	0	0	0	0

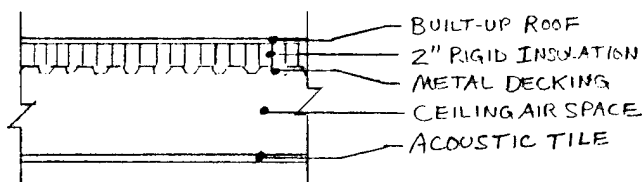
**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 6" CMU	1.89
5. AIR SPACE	0.91
6. 1/2" GYPSUM BOARD	0.45
7. INSIDE AIR FILM	0.68
TOTAL R-WALL =	5.44
U = 1/R	0.184

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. BUILT UP ROOF	0.34
3. 2" RIGID INSULATION	6.68
4. METAL DECKING	0.00
5. CEILING AIR SPACE	1.00
6. ACOUSTIC TILE	1.79
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	10.65
U = 1/R	0.094

GLASS TYPE:	DOUBLE PANE	R-GLASS	1.61
SLAB TYPE FLOOR:	CONCRETE	SLF	0.83
BASEMENT TYPE:	NONE	R-BASEM.	0.00
OVERHEAD DOOR TYPE:	NONE	R-ODOOR	0.00
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1809	X CFM / SQ.FT.	0.115	= 208
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	30		X CFM / OPENING / HR	1.385	= 42
TOTAL INFILTRATION (CFM)				=	250

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.000	=	0
UA PDOOR	= PDOOR AREA	84	X DOOR 'U'	0.391	=	33
UA WALL	= WALL AREA	1,725	X WALL 'U'	0.184	=	317
UA ROOF	= ROOF AREA	3,147	X ROOF 'U'	0.094	=	295
UA GLASS	= GLASS AREA	0	X GLASS 'U'	0.621	=	0
UA SLAB	= SLAB PERIM.	135	X SLF	0.830	=	112
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	250	X A. T. F.	1.035	=	258
TOTAL UA (BTU/HR°F)						1,016

**EMC NO.:**

**3204-000**

01-Mar-93

**PREPARED BY:**

**CHECKED BY:**

4109B1

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat (BTU/H)
1/RM1	4	1	Seated at rest	Theater, Movie	225	105	900	420
	6	5	Standing, light work, or walking slowly	Retail store, bank	270	220	1,620	1,320
TOTAL	10					TOTAL	2,520	1,740

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1/RM1	35	18	Incandescent - 60w	60	2,100
	4	20	Incandescent - 100w	100	400
	4	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	336
TOTAL	43			TOTAL	2,836

## Peak Value for Internal Gains

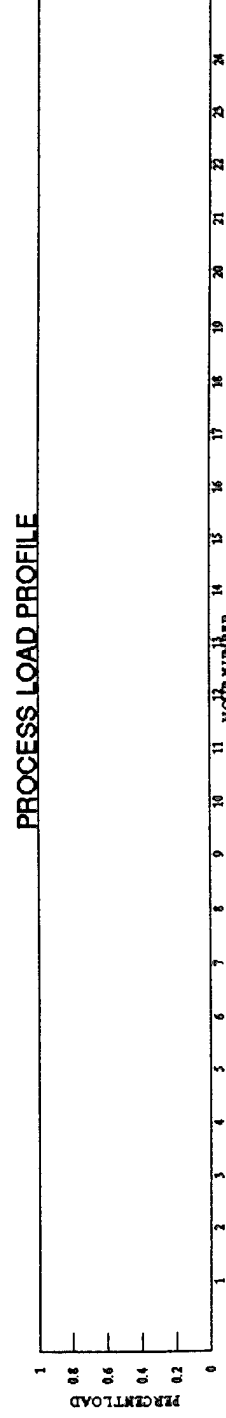
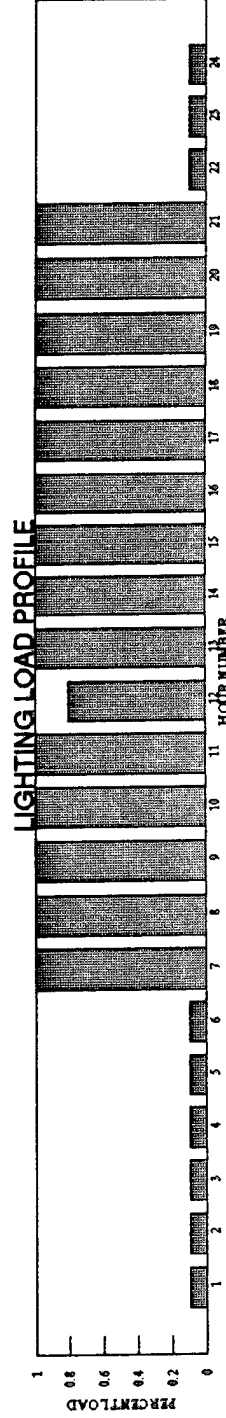
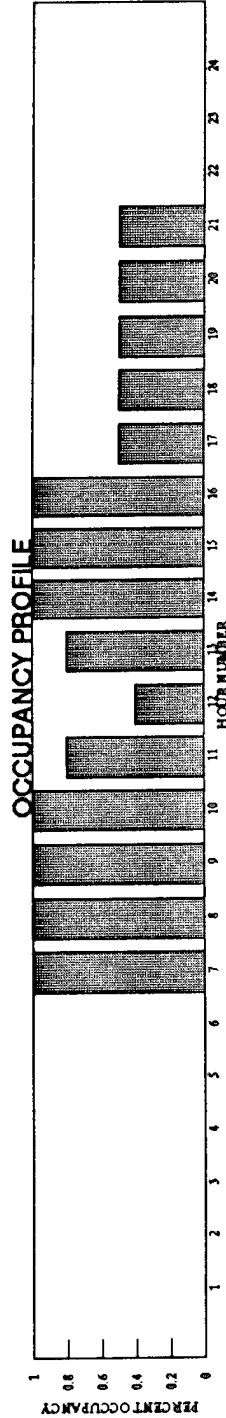
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# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 01-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109R1  
 BLDG: 4109  
 ZONE: 1/RM1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.4	0.8	1	1	1	0.5	0.5	0.5	0.5	1	1	0.1	0.1
		LIGHTING																								
		PROCESS																								



**3204-000**

03-Mar-93

BHS

CEL

4109R2

4109

## Rates of Heat Gain from Occupants of Conditioned Spaces

<b>Peak Value for Internal Gains</b>						
<b>Zone No.</b>	<b>No. of Equipment</b>	<b>Equip. Type</b>	<b>Description</b>	<b>Average Wattage</b>	<b>Heat Gain to Space (%)</b>	<b>Total (BTU)</b>
2/RM2	3	3	Microcomputer	350	91%	3,584
	3	5	Printer (laser)	870	34%	8,908
	1	10	Copy Machine	1,570	20%	5,358
	1	12	Typewriter	100	10%	341
				<b>TOTAL</b>	<b>41%</b>	<b>18,191</b>

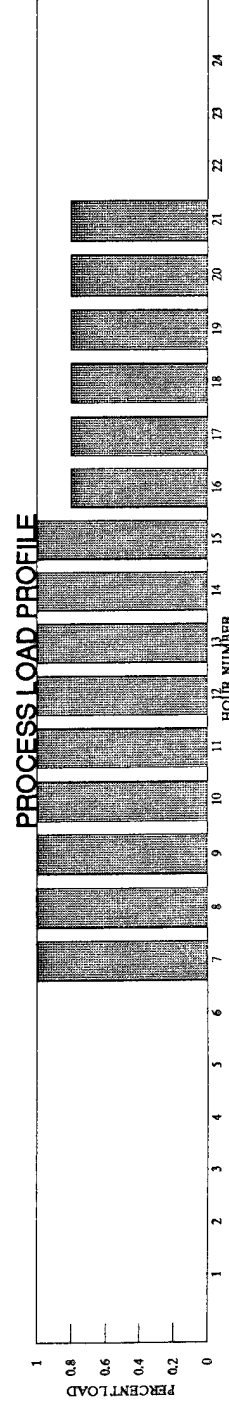
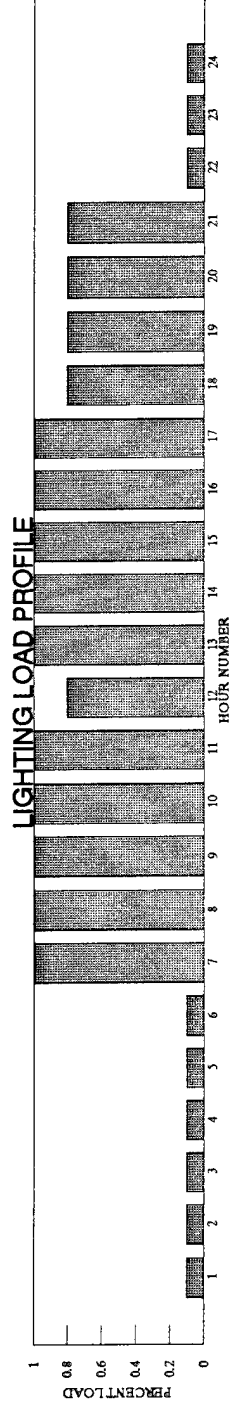
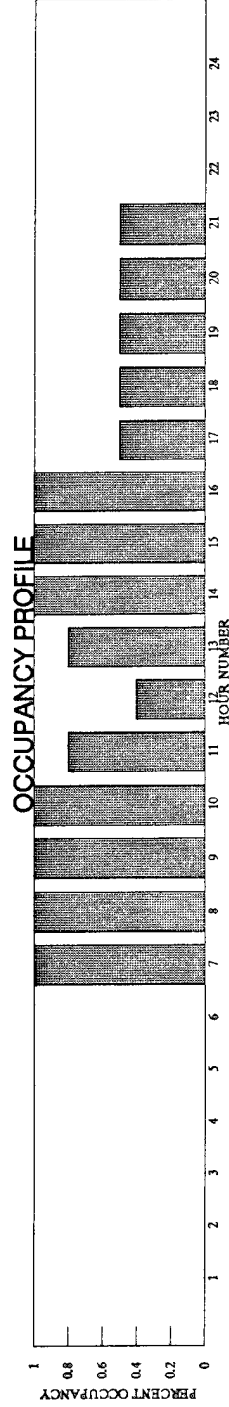


# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 03-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109R2  
 BLDG: 4109  
 ZONE: 2/RM2

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
3	Administration	OCCUPANCY																									
		LIGHTING	0.1	0.1	0.1	0.1	0.1		1	1	1	1	1	0.8	1	1	1	1	1	0.8	0.8	0.8	0.8	0.1	0.1	0.1	0.1
		PROCESS						1	1	1	1	1	1	1	1	1	1	0.8	0.8	0.8	0.8	0.8	0.8	0.8			



3204-000

01-Mar-93

**PREPARED BY:**

**CHECKED BY:**

**FILE:** 4109P3

**BLDG:**

**ZONE: 3/RMB**

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
3/RM3	2	5	Standing, light work, or walking slowly	Retail store, bank	270	220	540	440
	10	1	Seated at rest	Theater, Movie	225	105	2,250	1,050
TOTAL	12					TOTAL	2,790	1,490

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
3/RM3	26	18	Incandescent – 60w	60	1,560
	1	22	Incandescent – 300w	300	300
TOTAL	27			TOTAL	1,860

## Peak Value for Internal Gains

[illegible]

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG: DOUG CAGE

LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000

DATE: 01-Mar-93

PREPARED BY: BHS

CHECKED BY: CEL

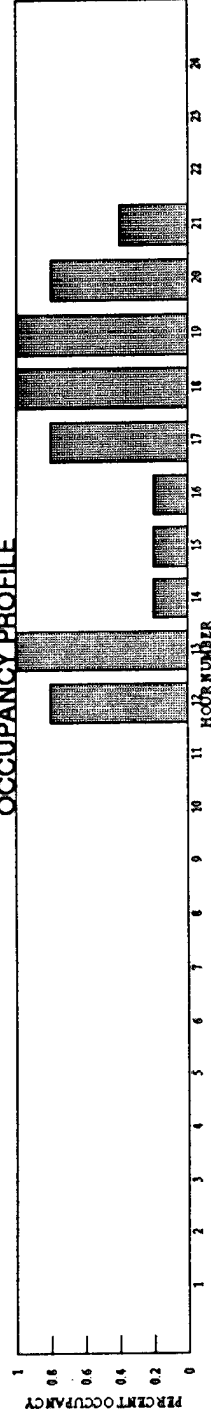
FILE: 4109R3

BLDG: 4109

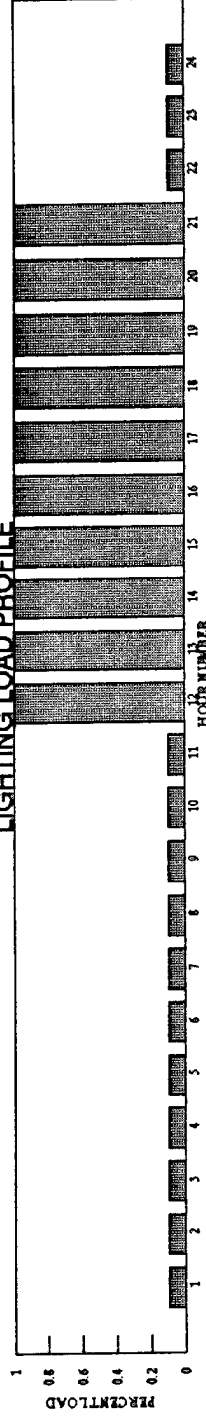
ZONE: 3/RM3

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	Cocktail Lnge	OCCUPANCY											0.8	1	0.2	0.2	0.2	0.8	1	1	1	0.8	0.4			
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	0.1	0.1	0.1
		PROCESS	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

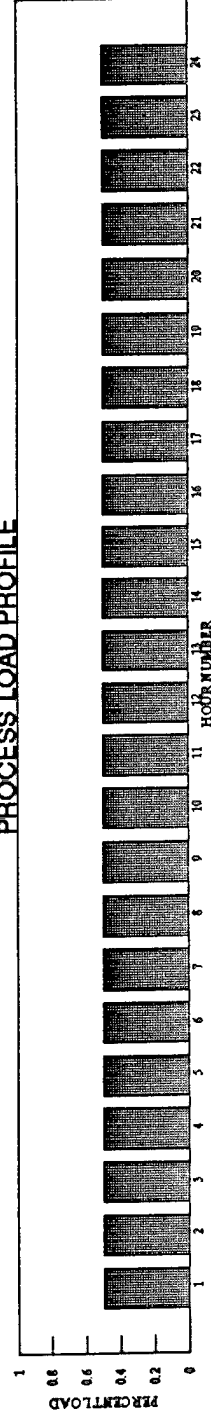
OCCUPANCY PROFILE



LIGHTING LOAD PROFILE



PROCESS LOAD PROFILE



**E M C Engineers, Inc.**  
PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
DATE: 01-Mar-93  
PREPARED BY: BHS  
CHECKED BY: CEL  
FILE: 4109P4  
BLDG: 4109

Rates of Heat Gain from Occupants of Conditioned Spaces							
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/h)	Latent (BTU/h)	TOT. Lat (BTU/H)
4/RM4	7	5	Standing, light work, or walking slowly	Retail store, bank	270	220	1,890
	15	1	Seated at rest	Theater, Movie	225	105	3,375
						<b>TOTAL</b>	<b>5,265</b>
<b>TOTAL</b>	<b>22</b>						<b>3,115</b>

<b>Peak Wattage Value for Lights</b>					
<b>Zone No.</b>	<b>No. of Fixtures</b>	<b>Fixture Type</b>	<b>Description</b>	<b>Watts/Fixture</b>	<b>Total Wattage</b>
4/RM4	33	18	Incandescent – 60w	60	1,980
	1	6	Fluorescent, 2 – 34w lamps, 16w ballast (2x4 ft. fixture)	84	84
TOTAL	34			TOTAL	2,064

Peak Value for Internal Gains							
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
4/RM4	1	62	Large Screen Television	300	15%	300	1,024
	1	50	Juke Box	109	15%	109	372
	1	46	Popcorn Machine	600	65%	600	2,048
	1	54	Refrigerator (Frostless 12 cu. ft.)	321	35%	321	1,096
TOTAL					42%	1,330	4,539

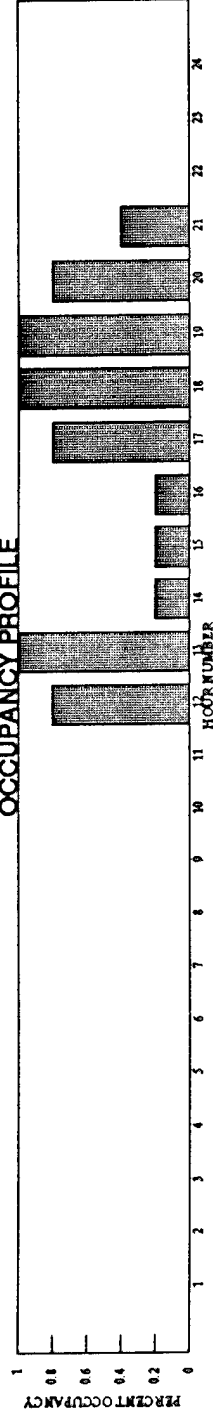
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

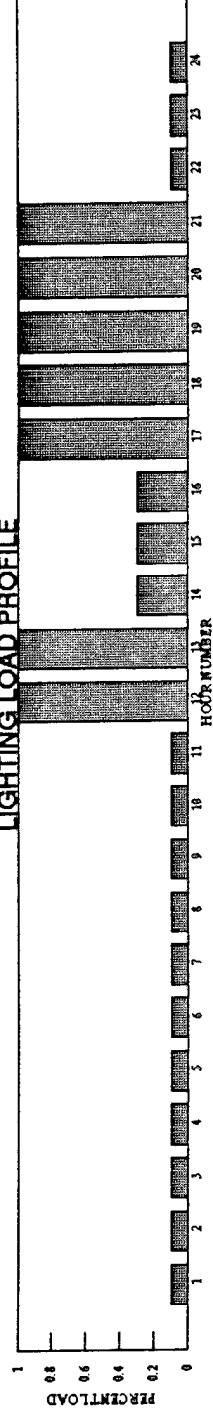
EMC NO.: 3204-000  
 DATE: 01-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109R4  
 BLDG: 4109  
 ZONE: 4/RM4

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
2	Bar/Game Rm	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	1	0.2	0.2	0.2	0.8	1	1	1	1	1	0.8	0.4		
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1	0.3	0.3	0.3	1	1	1	1	1	1	1	0.1	0.1
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9	0.9	0.4	0.4	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.1	0.1	0.1	

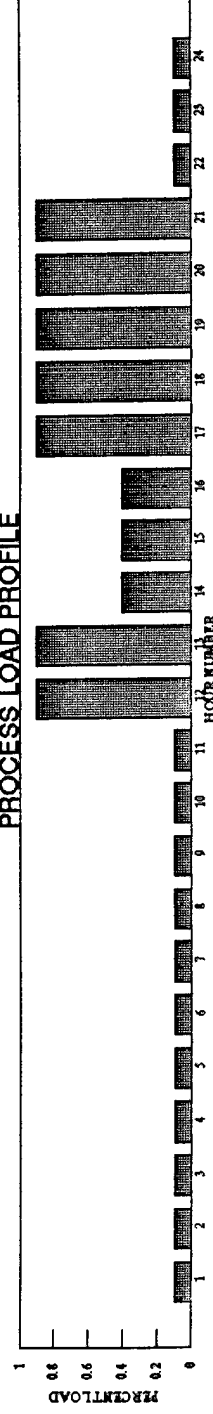
**OCCUPANCY PROFILE**



**LIGHTING LOAD PROFILE**



**PROCESS LOAD PROFILE**



**E M C Engineers, Inc.**  
PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
DATE: 01-Mar-93  
PREPARED BY: BHS  
CHECKED BY: CEL  
FILE: 4109R5  
BLDG: 4109

Rates of Heat Gain from Occupants of Conditioned Spaces							
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat. (BTU/H)
4/RM5	25	9	Moderate dancing	Dance hall	305	545	7,625
	25	1	Seated at rest	Theater, Movie	225	105	5,625
						<b>TOTAL</b>	<b>13,250</b>
<b>TOTAL</b>	<b>50</b>						<b>16,250</b>

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
4/RM5	75	18	Incandescent – 60w	60	4 500
	13	22	Incandescent – 300w	300	3 900
	9	6	Fluorescent, 2 – 34w lamps, 16w ballast (2x4 ft. fixture)	84	756
TOTAL	97			TOTAL	9 156

[illegible]

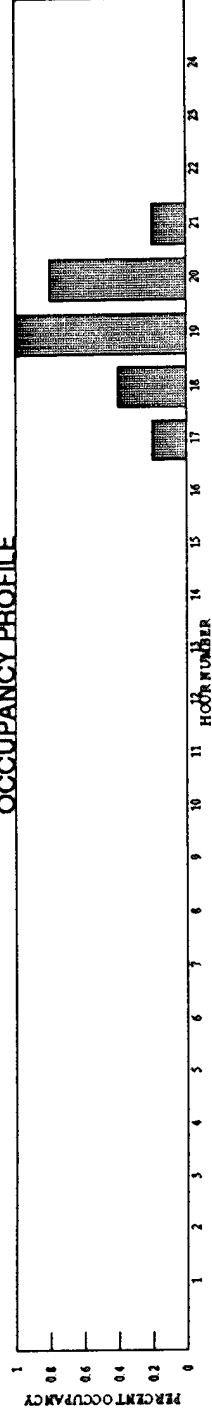
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

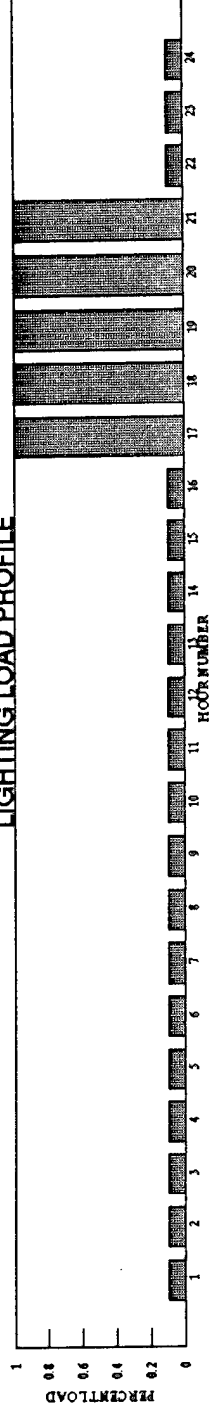
EMC NO.: 3204-000  
 DATE: 01-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109F5  
 BLDG: 4109  
 ZONE: 4/RM5

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
8	Ball Room	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	1	0.8	0.2			
		PROCESS																								

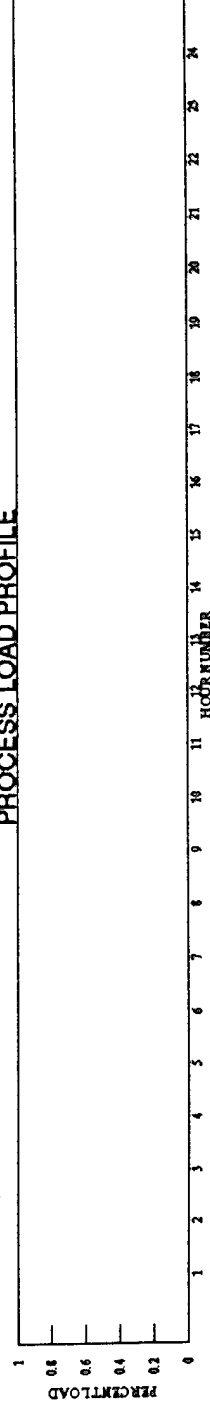
OCCUPANCY PROFILE



LIGHTING LOAD PROFILE



PROCESS LOAD PROFILE



**E M C Engineers, Inc.**  
PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
DATE: 01-Mar-93  
PREPARED BY: BHS  
CHECKED BY: CEL  
FILE: 4109R6  
BLDG: 4109

Rates of Heat Gain from Occupants of Conditioned Spaces							
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat (BTU/H)
4/RM6	40	3	Seated Eating	Restaurant	225	325	13,000
TOTAL	40					TOTAL	13,000

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
4/RM6	19	18	Incandescent – 60w	60	1,140
	5	21	Incandescent – 150w	150	750
TOTAL	24			TOTAL	1,890

[illegible]



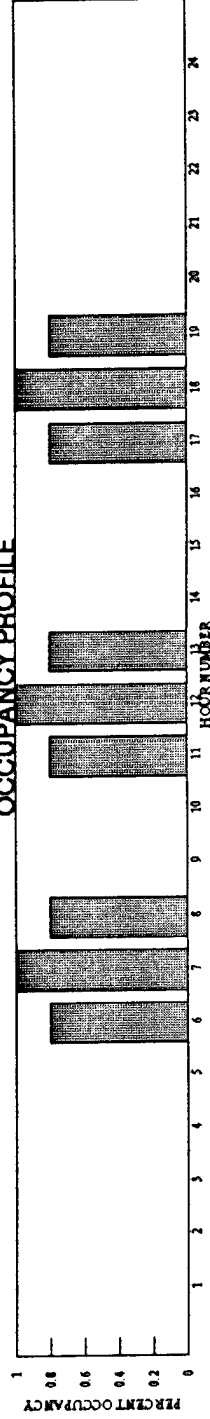
# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

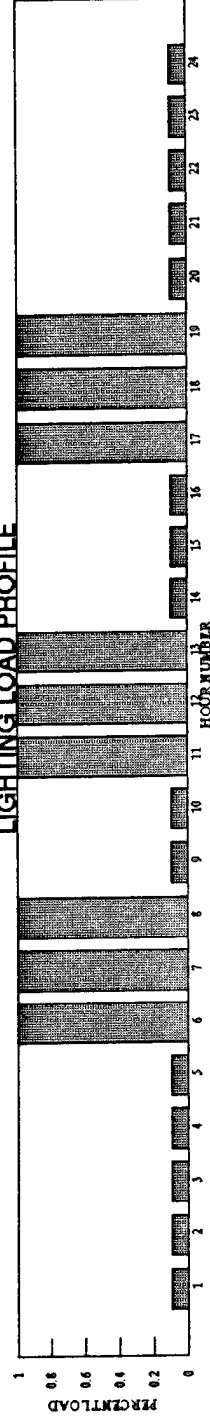
EMC NO.: 3204-000  
 DATE: 01-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109R6  
 BLDG: 4109  
 ZONE: 4/RM6

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	Dining Room	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	1	1	1	0.8	0.8	1	0.8	1	0.8	0.8	1	0.8	1	0.8	1	0.1	0.1	0.1	0.1
		PROCESS																								

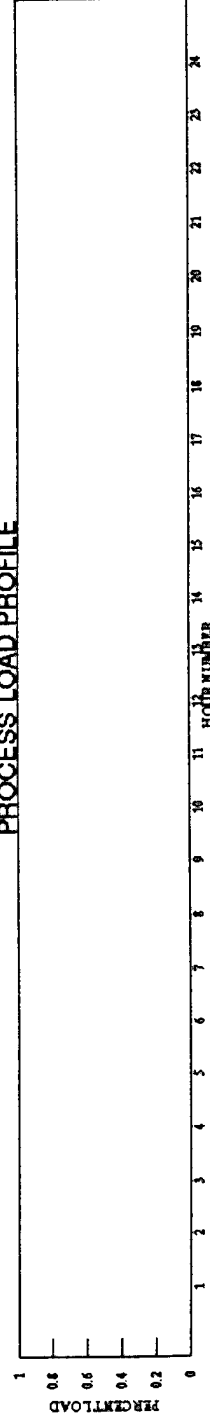
**OCCUPANCY PROFILE**



**LIGHTING LOAD PROFILE**



**PROCESS LOAD PROFILE**



# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.:

DATE: 03-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109R7  
 BLDG: 4109

3204-000

03-Mar-93

BHS

CEL

4109R7

4109

ZONE: 4/RM7

## **Rates of Heat Gain from Occupants of Conditioned Spaces**

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat (BTU/H)
4/RM7	10	6	Light bench work	Factory	275	475	2,750	4,750
TOTAL	10					TOTAL	2,750	4,750

## **Peak Wattage Value for Lights**

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
4/RM7	10	18	Incandescent - 60w	60	600
	58	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	4,872
TOTAL	68			TOTAL	5,472

## **Peak Value for Internal Gains**

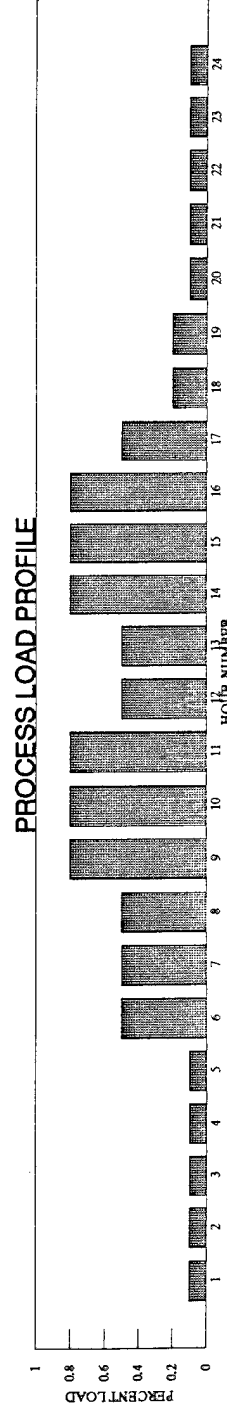
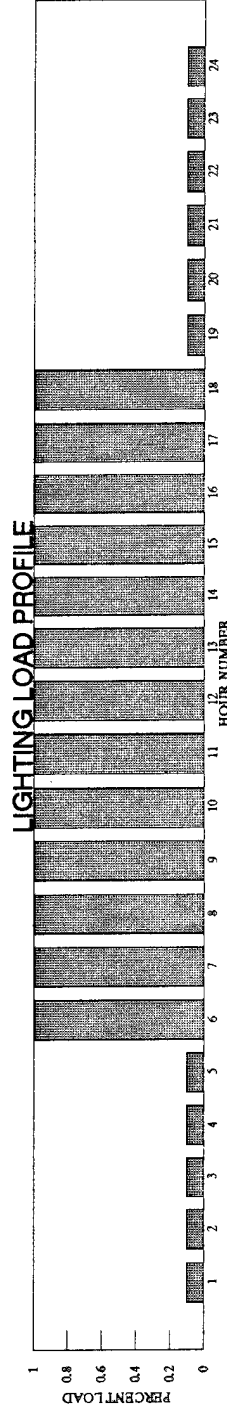
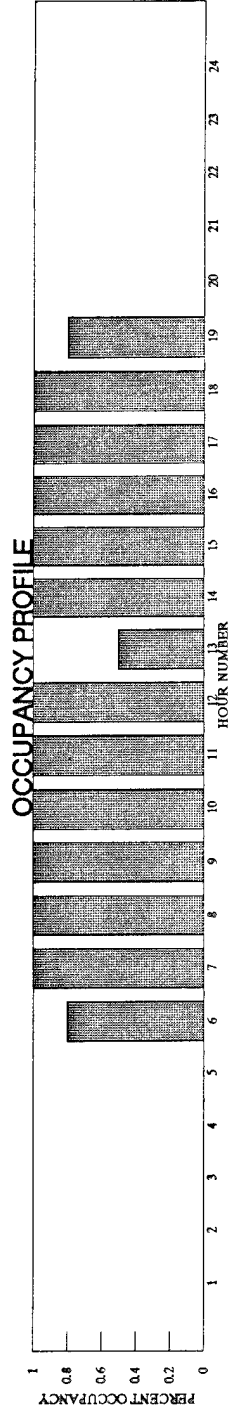
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
4/RM7	4	24	Coffee Maker	1,500	30%	6,000	20,478
	1	86	Ice maker	1,089	251%	1,089	3,717
	1	25	Cold Food/Beverage	1,535	50%	1,535	5,239
	7	55	Refrigerator/Freezer	326	20%	2,282	7,788
	2	92	Steam Kettle (large), per quart of capacity	88	14%	176	601
	3	103	Griddle/grill (large), per sq.ft. of cooking surface	4,981	10%	14,943	51,000
	3	95	Fryer (deep fat), per lb. of fat capacity	372		1,116	3,809
	3	111	Range (hot top/fry top), per sq.ft. of cooking surface	3,457		10,371	35,396
	1	108	Oven (convection), per cu.ft. of oven space	2,540		2,540	8,669
	3	81	Food Warmer (infrared bulb), per lamp	249	100%	747	2,550
	1	97	Oven (large convection), per cu.ft. of oven space	1,304		1,304	4,451
	1	98	Oven (small convection), per cu.ft. of oven space	3,030		3,030	10,341
	2	88	Mixer (large), per quart of capacity	28	100%	56	191
	1	83	Freezer (large)	1,340	40%	1,340	4,573
	1	79	Dishwasher (conveyor type water sanitizing), per 100dish/hr	339	45%	339	1,157
			TOTAL	TOTAL	19%	46,868	159,960

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 03-Mar-93  
 PREPARED BY: BHS  
 CHECKED BY: CEL  
 FILE: 4109R7  
 BLDG: 4109  
 ZONE: 4/RM7

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2	Kitchen	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8				
		PROCESS	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.8	0.8	0.8	0.5	0.5	0.8	0.8	0.8	0.8	0.5	0.2	0.2	0.1	0.1	0.1	0.1	0.1



## 01 Card - Job Information

Project: EEAP STUDY, EXPANSION OF EMCS  
 Location: FT. LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: E M C ENGINEERS, INC.

-----CARD 08-- Climatic Information -----

	Summer	Winter	Summer	Summer	Winter		Summer	Winter
Weather	Clearness	Clearness	Design	Design	Design	Building	Ground	Ground
Code	Number	Number	Dry Bulb	Wet Bulb	Dry Bulb	Orientation	Reflect	Reflect
SPRINGFM	.97	.97	94	78	3	50		

-----CARD 09-- Load Simulation Periods-----

1st Month	Last Month	Peak	1st Month	Last Month	1st Month	Last Month
Cooling	Cooling	Cooling	Summer	Summer	Daylight	Daylight
Simulation	Simulation	Load Hr	Period	Period	Savings	Savings
MAY	SEP		JUN	SEP	APR	OCT

-----CARD 10 -- Load Simulation Parameters-----

Cooling	Heating		Airflow	Airflow	Room	Put Wall
Load	Load	Ventilation	Input	Output	Circulation	RA Load
Method	Method	Method	Units	Units	Rate	to Room
TETD-TA1	TETD-TA1	OADB	ACTUAL	ACTUAL	MED-RCR	NO

-----CARD 11-- Energy Simulation Parameters-----

1st Month	Last Month	Level			Building
Energy	Energy	Of	Holiday	Calendar	Floor
Simulation	Simulation	Calculation	Code	Code	Area
JAN	DEC	ROOM	1978	1978	21253

-----CARD 13-- Daylighting Parameters -----

-----Atmospheric-----

---Moisture---		---Turbidity---		----Inside Visible Reflectivity----				Daylighting
Summer	Winter	Summer	Winter	Floor	Ceiling	Wall	Partition	Geometry
		.07	.07					

## ----- Load Section Alternative #1 -----

## ---- Load Alternative ----

Number	Description
1	BLDG 4109 BASERUN FT LEONARD WOOD

## -----CARD 20-- General Room Parameters -----

Zone			Floor		Const	Plenum	Acoustic	Floor to	Duplicate	Duplicate	Perimeter
Room	Reference	Room	Floor	Floor	Const	Plenum	Ceiling	Floor	Floors	Rooms per	Depth
Number	Number	Descrip	Length	Width	Type	Height	Resistance	Height	Multiplier	Zone	
1	1	STORE-BARBER	100	21.87	2	0		9			
2	2	ADMIN. OFFICES	100	34.2	2	0		9			
3	3	COCKTAIL LOUNGE	100	12	2	0		9			
4	4	BAR - GAME ROOM	100	24.44	2	0		9			
5	4	BALL ROOM	100	70.15	2	0		9			
6	4	DINING ROOM	100	18.4	2	0		9			
7	4	KITCHEN	100	31.47	2	0		9			

## -----CARD 21-- Thermostat Parameters -----

Cooling		Room	Cooling	Cooling	Heating	Heating	Heating	T'stat	Mass /	Carpet
Room	Room	Design	T'stat	T'stat	Room	T'stat	T'stat	Location	No. Hrs	On
Number	Design DB	RE	Driftpoint	Schedule	Design DB	Driftpoint	Schedule	Flag	Average	Floor
M	75			CLG75SUM	70		HTG70WNT	ROOM	MED70	NO
1										
2										YES
3										YES
4										YES
5										
6										
7										

## -----CARD 22-- Roof Parameters -----

Roof									
Room	Roof	Equal to	Roof	Roof	Roof	Const	Roof	Roof	Roof
Number	Number	Floor?	Length	Width	U-Value	Type	Direction	Tilt	Alpha
M	1				.094	47			
1	1	YES							
2	1	YES							
3	1	YES							
4	1	YES							
5	1	YES							
6	1	YES							
7	1	YES							

## -----CARD 24-- Wall Parameters -----

Room	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Wall	Ground
Number	Number	Length	Height	U-Value	Constuc	Type	Direction	Tilt	Alpha	Reflectance Multiplier
M	1			.184	74					
1	1	55	13.5				0			
1	2	47	13.5				270			
2	1	100	13.5				0			
3	1	34	13.5				0			
3	2	34	13.5				90			
4	1	47	13.5				180			
4	2	72	13.5				270			
6	1	40	13.5				90			
7	1	89	13.5				180			
7	2	45	13.5				90			

## -----CARD 25-- Wall/Glass Parameters -----

Room	Wall	Glass	Glass	Pct Glass	Glass	Shading	External	Internal	Percent	Visible	Inside
Number	Number	Length	Width	or No. of	U-Value	Coefficient	Shading	Shading	Solar to	Transmittance	Visible
				Windows			Type	Type	Ret. Air		Reflectance
M	1			1	.621	.58			3	.8	
1	2	10	2.9					1			
2	1	10	9.4								
3	1	9	6								
3	2	18	8								
4	1	6	6								
4	2	12	6								
6	1	21.333	9				4				

## -----CARD 26-- Schedules -----

Room	People	Lights	Ventilation	Infiltration	Reheat	Cooling	Heating	Auxiliary	Room	Daylighting
Number					Minimum	Fans	Fan	Fan	Exhaust	Controls
1	P4109	L4109RM1	AVAIL	AVAIL		AVAIL				
2	P4109	L4109RM2	AVAIL	AVAIL		AVAIL				
3	P41093&4	L4109RM3	AVAIL	AVAIL		AVAIL				
4	P41093&4	L4109RM4	AVAIL	AVAIL		AVAIL				
5	P4109RM5	L4109RM5	AVAIL	AVAIL		AVAIL				
6	P4109RM6	L4109RM6	AVAIL	AVAIL		AVAIL				
7	P4109RM7	L4109RM7	AVAIL	AVAIL		AVAIL				

## -----CARD 27-- People and Lights -----

Room	People	People	People	People	Lighting	Lighting	Lighting	Percent	Daylighting
Number	Value	Units	Sensible	Latent	Value	Units	Fixture	Ballast	Reference
							Type	Factor	Point 1
M		PEOPLE				WATTS	RECFL-NV	Ret. Air	Point 2
1	10		252	174	2836		INCAND		
2	8		250	200	3798		INCAND		
3	12		232	124	1860		INCAND		

## -----CARD 27-- People and Lights -----

TABLE 27. People and Light													
Room Number	People		People Sensible	People Latent	Lighting Value	Lighting Units	Lighting		Ballast Factor	Percent		--- Daylighting ---	
	Value	Units					Fixture Type	Lights to Ret. Air		Reference Point 1	Reference Point 2		
4	22		239	141	2064		INCAND						
5	50		265	325	9156		INCAND						
6	40		225	325	1890		INCAND						
7	10		275	475	5472								

## -----CARD 28--- Miscellaneous Equipment -----

Room Number	Misc Equipment		Energy Consump Value	Energy Consump Units	Schedule Code	Energy Meter Code	Percent of Load Sensible	Percent Misc. Load to Room	Percent Misc. Sens to Ret. Air	Percent Radiant Fraction	Optional Air Path
	Number	Descrip									
2	1	OFFICE EQUIPMENT	5330	WATTS	E4109RM2	ELEC		41			
3	1	APPLIANCES	321	WATTS	E4109RM3	ELEC		35			
4	1	ENTERTAIN. EQUIP	1330	WATTS	E4109RM4	ELEC		42			
7	1	KITCHEN EQUIP.	46868	WATTS	E4109RM7	ELEC		19			

## -----CARD 29--- Room Airflows -----

Room Number	-----Ventilation-----				-----Infiltration-----				--Reheat Minimum--	
	-----Cooling-----		-----Heating-----		-----Cooling-----		-----Heating-----		Value	Units
1	15	PCT-MCLG	15	PCT-MBTG	186	CFM	186	CFM		
2	15	PCT-MCLG	15	PCT-MBTG	197	CFM	197	CFM		
3	15	PCT-MCLG	15	PCT-MBTG	140	CFM	140	CFM		
4	15	PCT-MCLG	15	PCT-MBTG	206	CFM	206	CFM		
5	15	PCT-MCLG	15	PCT-MBTG						
6	15	PCT-MCLG	15	PCT-MBTG	111	CFM	111	CFM		
7	15	PCT-MCLG	15	PCT-MBTG	250	CFM	250	CFM		

## -----CARD 30- Fan Airflows -----

Room Number	-----Main-----				-----Auxiliary-----				--Room Exhaust--	
	-----Cooling-----		-----Heating-----		-----Cooling-----		-----Heating-----		Value	Units
1	1785	CFM								
2	3495	CFM								
3	2760	CFM								
4	4540	CFM								
5	10860	CFM								
6	3810	CFM								
7	1570	CFM								

## -----CARD 31-- Partition Parameters -----

Room Number	Partition Number	Partition Length	Partition Height	Partition U-Value	Const Type	Temp Flag	Cooling Temp	Heating Temp	Adjacent Room No
1	1	168	9		101	CONSTANT			
2	1	458	9		101	CONSTANT			
3	1	182	9		101	CONSTANT			
4	1	357	9		101	CONSTANT			
5	1	500	9		101	CONSTANT			
6	1	261	9		101	CONSTANT			
7	1	405	9		101	CONSTANT			

## -----CARD 32-- Exposed Floor Parameters-----

Exposed Slab				Exposed Floor						
Room Number	Floor Number	Perimeter Length	Loss Coefficient	Floor Area	Floor U-Value	Const Type	Temp Flag	Cooling Temp	Heating Temp	Adjacent Room No
1	1	102	.67							
2	1	100	.67							
3	1	68	.67							
4	1	119	.67							
6	1	40	.67							
7	1	135	.67							

## -----CARD 33-- External Shading -----

OVERHANG				VERTICAL FINS					
Shading Type	Glass Height	Above Glass	Projection Out	Glass Width	Projection Left	Projection Out	Projection Right	Projection Out	Adjacent Building Flag
4	9	0	4						

## -----CARD 34-- Internal Shading -----

Overall						Lockouts					
Shading Type	Overall U-Value	Shading Coefficient	Schedule Code	Shade Location	Visible Transmittance	Min OADB	Max Solar	Solar Ctrl	Max Prob	Glare	Glare Ctrl
3	.452	.585	FL-INSHD	INSIDE							

## ----- System Section Alternative #1 -----

## -----CARD 39-- System Alternative -----

Number	Description
1	BLDG 4109 BASERUN FT LEONARD WOOD

## -----CARD 40-- System Type -----

OPTIONAL VENTILATION SYSTEM	
System	Ventil Fan



Set	System	Deck	Cooling	Heating	Cooling	Heating	Static
Number	Type	Location	SADBVh	SADBVh	Schedule	Schedule	Pressure
1	SZ						

## -----CARD 40--- System Type -----

System		-----OPTIONAL VENTILATION SYSTEM-----						
Set	System	Ventil	Deck	Cooling	Heating	Cooling	Heating	Static
Number	Type	Location	SADBVh	SADBVh	Schedule	Schedule	Pressure	
2	SZ							
3	SZ							
4	ME							

## -----CARD 41-- Zone Assignment -----

System	Ref #1		Ref #2		Ref #3		Ref #4		Ref #5		Ref #6	
Set	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
1	1	1										
2	2	2										
3	3	3										
4	4	4										

## -----CARD 42--- Fan SP and Duct Parameters-----

System	Cool	Heat	Return	Mn Exh	Aux	Rm Exh	Cool	Return	Supply	Supply	Return
Set	Fan	Fan	Fan	Fan	Fan	Fan	Fan Mtr	Fan Mtr	Duct	Duct	Air
Number	SP	SP	SP	SP	SP	SP	Loc	Loc	Ht Gn	Loc	Path
1	.2						OMIT			OTHER	DUCTED
2	.2						OMIT			OTHER	DUCTED
3	.3						OMIT			OTHER	DUCTED
4	.5						OMIT			OTHER	DUCTED

## -----CARD 43-- Airflow Design Temperatures -----

System	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Design
Set	Cooling	Cooling	Heating	Heating	Cooling	Cooling	Preheat	Preheat	Room	Ht Rec	
Number	SADB	SADB	SADB	SADB	Lv DB	Lv DB	Lv DB	Lv DB	RB	Diff	
1	52.1	52.1									
2											
3	62.4	62.4									
4	62.8	62.8									

## -----CARD 45--- Equipment Schedules -----

System	Main	Direct	Indirect	Auxiliary	Main	Main				Auxiliary
Set	Cooling	Evap	Evap	Cooling	Heating	Preheat	Reheat	Mech.	Heating	
Number	Coil	Economizer	Coil	Coil	Coil	Coil	Coil	Humidity	Coil	
1	FLCCOIL	OFF	OFF	OFF	OFF	FLCCOIL	OFF	OFF	OFF	OFF

System	Main		Direct	Indirect	Auxiliary	Main	Main			Auxiliary
Set	Cooling		Evap	Evap	Cooling	Heating	Preheat	Reheat	Mech.	Heating
Number	Coil	Economizer	Coil	Coil	Coil	Coil	Coil	Coil	Humidity	Coil
2	FLCCOIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	OFF	OFF
3	FLCCOIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	OFF	OFF
4	FLCCOIL	OFF	OFF	OFF	OFF	FLHCOIL	OFF	OFF	OFF	OFF

System	People	Lights	Misc	-----MAIN		COOLING-----		---AUX COOLING---	
Set	People	Lights	Loads	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Variance	Variance	Variance	Value	Units	Sizing	Location	Value	Units
1				55.5	MBH				
2				108.75	MBH				
3				113.1	MBH				
4				960	MBH				

System	---MAIN HEATING---		----PREHEAT----		-----REHEAT-----		--HUMIDIFICATION--		---AUX HEATING---	
Set	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
1										
2	405.8	MBH								
3	107	MBH								
4	547.5	MBH								

Alternative	Elec Consump	Elec Demand	Demand	
Number	Time of Day	Time of Day	Limit	
	Schedule	Schedule	Max KW	Alternative Description
1				BLDG 4109 BASERUN FT LEONARD WOOD

[illegible]

CARD 62-- Cooling Equipment Parameters												Seq	Demand
Cooling Equipment Parameters						HEAT RECOVERY						Seq	Demand
Ref	Code	Of	Capacity		Energy		Capacity		Energy		Order	Seq	Limit
Num	Name	Units	Value	Units	Value	Units	Value	Units	Value	Units	Num	Type	Number
1	EQ1121L	1	52	TONS							1	PAR	
2	EQ1121L	1	52	TONS							2	PAR	

[illegible]

Load	All Coil										
Assignment	Loads To	-Group 1-	-Group 2-	-Group 3-	-Group 4-	-Group 5-	-Group 6-	-Group 7-	-Group 8-	-Group 9-	
Reference	Heating Ref	Begin	End	Begin	End	Begin	End	Begin	End	Begin	End
1	1	1	4								

Heat	Equip	Number	HW Pmp				Energy		Seq	Switch				Demand
Ref	Code	Of	Full Ld		Cap'y		Rate		Order	over	Hot	Misc.		Limit
Number	Name	Units	Value	Units	Value	Units	Value	Units	Number	Control	Strg	Acc.	Cogen	Number
1	EQ2001	1	.56	KW	1228.6	MBH	80	PCTEFF				1		

System	Set	Cooling	Heating	Return	Exhaust	Auxiliary	Room	Optional
	Number	Fan	Fan	Fan	Fan	Supply	Exhaust	Ventilation
	1	EQ4003						
	2	EQ4003						
	3	EQ4003						
	4	EQ4002						

[illegible]

## -----CARD 70-- Fan Equipment KW Overrides -----

-----MAIN SYSTEM-----				--OTHER SYSTEM--				----DEMAND LIMIT PRIORITY----				
System	Cool	Heat	Ret	Exh	Aux	Room	Opt			Room	Opt	
Set	Fan	Fan	Fan	Fan	Sup	Exh	Vent	Cool	Heat	Aux	Exh	Vent
Number	KW	KW	KW	KW	KW	KW	KW	Fan	Fan	Fan	Fan	Fan
3	.746											
4	7.46											

## -----CARD 74--- Condenser / Cooling Tower Parameters -----

Cooling				Energy	Energy		Number	Percent	Low Spd	Low Spd
Tower	Tower	Capacity	Capacity	Consump	Consump	Fluid	Tower	Of	Airflow	Energy
Ref	Code	Value	Units	Value	Units	Type	Type	Cells	Low Spd	Value
1	EQ5200	52	TONS	3.357	KW	REFRIG	CNDFAN	3		
2	EQ5200	52	TONS	3.357	KW	REFRIG	CNDFAN	3		

## -----CARD 75--- Miscellaneous Accessory -----

#1				#2				#3				
Misc	Equip	Energy	Energy	Sched	Equip	Energy	Energy	Sched	Equip	Energy	Energy	Sched
Ref	Code	Value	Units	Code	Code	Value	Units	Code	Code	Value	Units	Code
1	EQ5013	.373	KW	AVAIL	EQ5013	.373	KW	AVAIL				

## Utility Description Reference Table

## Schedules:

## AVAIL AVAILABLE (100%)

CLG75SUM COOLING TSTAT AT 75 (MAY THRU SEPT)  
E4109RM2 EQUIP SCHEDULE - BLDG 4109 ROOM 2  
E4109RM3 EQUIP SCHEDULE - BLDG 4109 ROOM 3  
E4109RM4 EQUIP SCHEDULE - BLDG 4109 ROOM 4  
E4109RM7 EQUIP SCHEDULE - BLDG 4109 ROOM 7  
FL-INSHD INTERNAL SHADING: VENITIAN BLINDS  
FLCCOIL COOLING COIL SCHEDULE - MAY THRU SEPT  
FLHCOIL HEATING COIL SCHEDULE - OCT THRU APR  
HTG70WNT HEATING T-STAT AT 70 (OCT TO APR)  
L4109RM1 LIGHT SCHEDULE - BLDG 4109 ROOM 1  
L4109RM2 LIGHT SCHEDULE - BLDG 4109 ROOM 2  
L4109RM3 LIGHT SCHEDULE - BLDG 4109 ROOM 3  
L4109RM4 LIGHT SCHEDULE - BLDG 4109 ROOM 4  
L4109RM5 LIGHT SCHEDULE - BLDG 4109 ROOM 5  
L4109RM6 LIGHT SCHEDULE - BLDG 4109 ROOM 6  
L4109RM7 LIGHT SCHEDULE - BLDG 4109 ROOM 7  
OFF ALWAYS OFF  
P4109 PEOPLE SCHEDULE - BLDG 4109  
P41093&4 PEOPLE SCHEDULE - BLDG 4109 RMS 3 & 4  
P4109RM5 PEOPLE SCHEDULE - BLDG 4109  
P4109RM6 PEOPLE SCHEDULE - BLDG 4109 ROOM 6  
P4109RM7 PEOPLE SCHEDULE - BLDG 4109 ROOM 7

## System:

MZ MULTIZONE  
SZ SINGLE ZONE

## Equipment:

## Cooling:

EQ1121L AIR-CLD RECIP 35-60 TONS

## Heating:

EQ2001 GAS FIRE TUBE HOT WATER

## Fan:

EQ4002 BI CENTRIF. FAN C.V.  
EQ4003 FC CENTRIF. FAN C.V.

## Tower:

EQ5200 CONDENSER FANS

## Misc:

EQ5013 WATER CIRC. PUMP C.V.

Schedule Name: AVAIL  
Project: AVAILABLE (100)  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: HTG  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	100
24	

Schedule Name: CLG75SUM

Project: COOLING TSTAT AT 75 (MAY THRU S

Location:

Client:

Program User:

Comments: COOLING TSTAT AT 75 (MAY THRU

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 75  
24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24



Schedule Name: E4109RM2  
 Project: EQUIP SCHEDULE - BLDG 4109 ROOM  
 Location: FT LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: EMC ENGINEERS, INC.  
 Comments: EQUIP SCHEDULE

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	0
7	100
16	80
22	0
24	

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	0
24	

Schedule Name: E4109RM3  
Project: EQUIP SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIP SCHEDULE

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	50
24	

Schedule Name: E4109RM4  
Project: EQUIP SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIP SCHEDULE

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent  
-----

0	10
12	90
14	40
17	90
22	10
24	

Schedule Name: E4109RM7  
Project: EQUIP SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIP SCHEDULE

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	10
6	50
9	80
12	50
14	80
17	50
18	20
20	10
24	

Schedule Name: FL-INSHD  
Project: INTERNAL SHADING: VENITIAN BLIN  
Location: FT LEONARD WOOD  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: INTERNAL SHADING SCHEDULE

Starting Month: JAN Ending Month: APR  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util	Percent
0	75	
24		

Starting Month: MAY Ending Month: SEP  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util	Percent
0	35	
24		

Starting Month: OCT Ending Month: DEC  
Starting Day Type: WKDY Ending Day Type: WKDY

Hour	Util	Percent
0	75	
24		

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour	Util	Percent
0	25	
24		

Schedule Name: FLCCOIL  
Project: COOLING COIL SCHEDULE - MAY THR  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: COOLING COIL SCHEDULE - MAY TH

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0		0
24		

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0		100
24		

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0		0
24		

Schedule Name: FLECOIL

Project: HEATING COIL SCHEDULE - OCT THR

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: HEATING COIL SCHEDULE - OCT TH

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	100
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	100
24	

Schedule Name: BTG70WNT

Project: HEATING T-STAT AT 70 (OCT TO AP

Location:

Client:

Program User:

Comments: HEATING T-STAT AT 70 (OCT TO A

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 70  
24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 35  
24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 70  
24



Schedule Name: L4109RM1  
Project: LIGHT SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHT SCHEDULE

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

-----  
0 10  
7 100  
12 80  
13 100  
22 10  
24

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

-----  
0 0  
24

Schedule Name: L4109RM2  
Project: LIGHT SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHT SCHEDULE

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	10
7	100
12	80
13	100
18	80
22	10
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
24	

Schedule Name: L4109RM3  
Project: LIGHT SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHT SCHEDULE - ROOM 3

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0	10	
12	100	
22	10	
24		

Schedule Name: L4109RM4  
Project: LIGHT SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHT SCHEDULE - ROOM 4

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent  
-----

0	10
12	100
14	30
17	100
22	10
24	

Schedule Name: L4109RM5  
Project: LIGHT SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHT SCHEDULE - ROOM 5

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	10
17	100
22	10
24	

Schedule Name: L4109RM6

Project: LIGHT SCHEDULE - BLDG 4109 ROOM

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: LIGHT SCHEDULE - ROOM 6

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	10
6	100
9	10
11	100
14	10
17	100
20	10
24	

Schedule Name: L4109RM7  
Project: LIGHT SCHEDULE - BLDG 4109 ROOM  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHT SCHEDULE - ROOM 7

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	10
6	100
19	10
24	

Schedule Name: OFF  
Project: ALWAYS OFF  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: HTG  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0	0	
24		



Schedule Name: P4109  
 Project: PEOPLE SCHEDULE - BLDG 4109  
 Location: FT LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: EMC ENGINEERS, INC.  
 Comments: PEOPLE SCHEDULE

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: DSGN Ending Day Type: WKDY

Hour	Util Percent
0	0
7	100
11	80
12	40
13	80
14	100
17	50
22	0
24	

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: SAT Ending Day Type: SUN

Hour	Util Percent
0	0
24	

Schedule Name: P41093&amp;4

Project: PEOPLE SCHEDULE - BLDG 2100

Location: FT LEONARD WOOD, MO

Client: US ARMY

Program User: EMC ENGINEERS, INC.

Comments: PEOPLE SCHEDULE - RMS 3 AND 4

Starting Month: JAN Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
12	80
13	100
14	20
17	80
18	100
20	80
21	40
22	0
24	

TRACE 600 input file D:\3204\TRACE\4109.TM by Trane Customer Direct Service Network

Schedule Name: P4109RMS  
Project: PEOPLE SCHEDULE - BLDG 4109  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - ROOM 5

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
17	20
18	40
19	100
20	80
21	20
22	0
24	

TRACE 600 input file D:\3204\TRACE\4109.TM by Trane Customer Direct Service Network

Schedule Name: F4109RM6  
Project: PEOPLE SCHEDULE - BLDG 4109 ROO  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - ROOM 6

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
6	80
7	100
9	0
11	80
12	100
13	80
14	0
17	80
18	100
19	80
20	0
24	

TRACE 600 input file D:\3204\TRACE\4109.TM by Trane Customer Direct Service Network

Schedule Name: P4109RM7  
 Project: PEOPLE SCHEDULE - BLDG 4109 ROO  
 Location: FT LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: EMC ENGINEERS, INC.  
 Comments: PEOPLE SCHEDULE - ROOM 7

Starting Month: JAN Ending Month: DEC  
 Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	0
6	80
7	100
13	50
14	100
19	80
20	0
24	

```
*****
*****
**                                     **
**          TRACE    600    ANALYSIS          **
**                                     **
**          by          **                                     **
**                                     **
*****
*****
```

REAP STUDY, EXPANSION OF EMCS  
FT. LEONARD WOOD, MO  
US ARMY  
E M C ENGINEERS, INC.

Weather File Code:	SPRINGFM
Location:	SPRINGFIELD, MISSOURI
Latitude:	37.0 (deg)
Longitude:	93.0 (deg)
Time Zone:	6
Elevation:	1,265 (ft)
Barometric Pressure:	28.5 (in. Hg)
Summer Clearness Number:	0.97
Winter Clearness Number:	0.97
Summer Design Dry Bulb:	94 (F)
Summer Design Wet Bulb:	78 (F)
Winter Design Dry Bulb:	3 (F)
Summer Ground Reflectance:	0.20
Winter Ground Reflectance:	0.20
Air Density:	0.0724 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0621 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,675.1 (Btu-min./hr/cuft)
Enthalpy Factor:	4.3449 (Lb-min./hr/cuft)
Design Simulation Period:	May To September
System Simulation Period:	January To December
Cooling Load Methodology:	TETD/Time Averaging
Time/Date Program was Run:	9: 9:59 3/26/93
Dataset Name:	4109 .TM

AIRFLOW - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Airflow Quantities)

System Number	System Type	Main					Auxil. Supply	Room Exhaust
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Airflow (Cfm)	Airflow (Cfm)
1	SZ	268	1,785	1,785	1,971	454	0	0
2	SZ	524	3,495	3,495	3,692	721	0	0
3	SZ	414	2,760	2,760	2,900	554	0	0
4	MZ	3,117	20,780	20,780	21,347	3,684	0	0
Totals		4,323	28,820	28,820	29,910	5,413	0	0

CAPACITY - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Capacity Quantities)

System Number	System Type	Cooling				Heating						
		Main Sys. Capacity (Tons)	Aux. Sys. Capacity (Tons)	Opt. Vent Capacity (Tons)	Cooling Totals (Tons)	Main Sys. Capacity (Btuh)	Aux. Sys. Capacity (Btuh)	Preheat Capacity (Btuh)	Reheat Capacity (Btuh)	Humidif. Capacity (Btuh)	Opt. Vent Capacity (Btuh)	Heating Totals (Btuh)
1	SZ	4.6	0.0	0.0	4.6	-68,574	0	0	0	0	0	-68,574
2	SZ	9.1	0.0	0.0	9.1	-405,800	0	0	0	0	0	-405,800
3	SZ	9.4	0.0	0.0	9.4	-107,000	0	-6,740	0	0	0	-107,000
4	MZ	80.0	0.0	0.0	80.0	-547,500	0	-57,358	0	0	0	-604,858
Totals		103.1	0.0	0.0	103.1	-1,128,874	0	-64,098	0	0	0	-1,186,232

The building peaked at hour 17 month 7 with a capacity of 53.5 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent Outside Air	Cooling				Heating		Floor Area Sq Ft
				Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	SZ	15.00	0.82	385.9	472.9	25.38	0.82	-31.36	2,187
2	Main	SZ	15.00	1.02	385.7	377.4	31.80	1.02	-118.65	3,420
3	Main	SZ	15.00	2.30	292.8	127.3	94.25	2.30	-89.17	1,200
4	Main	MZ	15.00	1.44	259.7	180.6	66.45	1.44	-41.87	14,446

System 1 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK *****						CLG SPACE PEAK *****			HEATING COIL PEAK *****		
Peaked at Time ==>						Mo/Hr: 7/16			Mo/Hr: 13/ 1		
Outside Air ==>						OADB: 93			OADB: 3		
Envelope Loads	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Perct Of Tot (%)	Space Sensible (Btuh)	Perct Of Tot (%)	Space Peak (Btuh)	Coil Peak (Btuh)	Perct Of Tot (%)	
Skylite Solr	0	0		0	0.00	0	0.00	0	0	0.00	
Skylite Cond	0	0		0	0.00	0	0.00	0	0	0.00	
Roof Cond	18,461	0		18,461	26.69	18,461	42.52	-13,774	-13,774	20.09	
Glass Solar	1,166	0		1,166	1.69	1,166	2.68	0	0	0.00	
Glass Cond	412	0		412	0.60	412	0.95	-1,597	-1,597	2.33	
Wall Cond	7,474	0		7,474	10.81	7,474	17.22	-16,527	-16,527	24.10	
Partition	0			0	0.00	0	0.00	0	0	0.00	
Exposed Floor	0			0	0.00	0	0.00	-4,579	-4,579	6.68	
Infiltration	11,247			11,247	16.26	3,620	8.34	-13,236	-13,236	19.30	
Sub Total==>	38,759	0		38,759	56.04	31,132	71.71	-49,712	-49,712	72.49	
*****											
Internal Loads											
Lights	9,679	0		9,679	14.00	9,679	22.30	0	0	0.00	
People	4,159			4,159	6.01	2,419	5.57	0	0	0.00	
Misc	0	0	0	0	0.00	0	0.00	0	0	0.00	
Sub Total==>	13,838	0	0	13,838	20.01	12,098	27.87	0	0	0.00	
Ceiling Load	0			0	0.00	0	0.00	0	-19,053	27.78	
Outside Air	0	0	0	16,190	23.41	0	0.00	0	190	-0.28	
Sup. Fan Heat				190	0.28		0.00		0	0.00	
Ret. Fan Heat		0		0	0.00		0.00		0	0.00	
Duct Heat Pkup		0		0	0.00		0.00		0	0.00	
OV/UNDR Sizing	183			183	0.26	183	0.42	0	0	0.00	
Exhaust Heat		0	0	0	0.00		0.00		0	0.00	
Terminal Bypass		0	0	0	0.00		0.00		0	0.00	
*****											
Grand Total==>	52,780	0	0	69,161	100.00	43,414	100.00	-49,712	-68,574	100.00	

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
				Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	2,187	
Main Clg	4.6	55.5	39.2	1,785	77.7	64.0	71.9	52.0	51.0	56.9	Part	1,512
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	102
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	2,187
Totals	4.6	55.5									Wall	1,377

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----					-----ENGINEERING CHECKS-----			-----TEMPERATURES (F)-----		
Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	15.0	Type	Clg	Htg				
				Vent	268	268	Clg Cfm/Sqft	0.82	SADB	52.1	96.2				
Main Htg	-68.6	1,785	60.0	Infil	186	186	Clg Cfm/Ton	385.95	Plenum	75.0	70.0				
Aux Htg	0.0	0	0.0	Supply	1,785	1,785	Clg Sqft/Ton	472.86	Return	75.0	70.0				
Preheat	-0.0	1,785	60.0	Mincfm	0	0	Clg Btuh/Sqft	25.38	Ret/OA	77.7	60.0				
Reheat	0.0	0	0.0	Return	1,785	1,785	No. People	10	Runairnd	75.0	70.0				
Humidif	0.0	0	0.0	Exhaust	268	268	Htg % OA	15.0	Fn MtrTD	0.0	0.0				
Opt Vent	0.0	0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	0.82	Fn BldTD	0.0	0.0				
Total	-68.6			Auxil	0	0	Htg Btuh/Sqft	-31.36	Fn Frict	0.1	0.0				



System 2 Peak SZ - SINGLE ZONE

***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****									
Peaked at Time ==> Mo/Hr: 7/15					Mo/Hr: 7/15				
Outside Air ==> OADB/WB/HR: 94/ 78/124.0					OADB: 94				
					Mo/Hr: 13/ 1				
					OADB: 3				
Space	Ret. Air	Ret. Air	Net	Percent	Space	Percent	Space Peak	Coil Peak	Percent
Sens.+Lat.	Sensible	Latent	Total	Of Tot	Sensible	Of Tot	Space Sens	Tot Sens	Of Tot
(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	(Btuh)	(%)	(Btuh)	(Btuh)	(%)
Envelope Loads									
Skylite Solr	0	0	0	0.00	0	0.00	0	0	0.00
Skylite Cond	0	0	0	0.00	0	0.00	0	0	0.00
Roof Cond	29,673	0	29,673	27.93	29,673	44.14	-21,539	-21,539	22.30
Glass Solar	1,974	0	1,974	1.86	1,974	2.94	0	0	0.00
Glass Cond	1,039	0	1,039	0.98	1,039	1.55	-4,121	-4,121	4.27
Wall Cond	8,805	0	8,805	8.29	8,805	13.10	-15,484	-15,484	16.03
Partition	0	0	0	0.00	0	0.00	0	0	0.00
Exposed Floor	0	0	0	0.00	0	0.00	-4,489	-4,489	4.65
Infiltration	11,209	0	11,209	10.55	3,975	5.91	-14,018	-14,018	14.51
Sub Total==>	52,700	0	52,700	49.60	45,466	67.64	-59,652	-59,652	61.76
Internal Loads									
Lights	12,574	0	12,574	11.83	12,574	18.71	0	0	0.00
People	3,320	0	3,320	3.12	1,720	2.56	0	0	0.00
Misc	7,458	0	7,458	7.02	7,458	11.10	0	0	0.00
Sub Total==>	23,352	0	23,352	21.98	21,752	32.36	0	0	0.00
Ceiling Load	0	0	0	0.00	0	0.00	0	0	0.00
Outside Air	0	0	29,830	28.07	0	0.00	0	-37,305	38.62
Sup. Fan Heat			373	0.35		0.00		373	-0.39
Ret. Fan Heat		0	0	0.00		0.00		0	0.00
Duct Heat Pkup		0	0	0.00		0.00		0	0.00
OV/UNDR Sizing	0	0	0	-0.00	0	-0.00	0	0	0.00
Exhaust Heat		0	0	0.00		0.00		0	0.00
Terminal Bypass		0	0	0.00		0.00		0	0.00
Grand Total==>	76,052	0	106,255	100.00	67,218	100.00	-59,652	-96,584	100.00

-----COOLING COIL SELECTION-----									
Total Capacity		Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR		
(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains
Main Clg	9.1	108.7	80.0	3,495	77.8	65.1	77.3	56.8	54.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0
Totals	9.1	108.7							

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	15.0	Type	Clg	Htg	
(Mbh)	(cfm)	Deg F	Deg F	Vent	524	524	Clg Cfm/Sqft	1.02	SADB	56.9	86.1	
Main Htg	-405.8	3,495	-23.4	86.0	Infil	197	197	Clg Cfm/Ton	385.66	Plenum	75.0	70.0
Aux Htg	0.0	0	0.0	0.0	Supply	3,495	3,495	Clg Sqft/Ton	377.38	Return	75.0	70.0
Preheat	-0.0	3,495	60.0	56.8	Mincfm	0	0	Clg Btuh/Sqft	31.80	Ret/OA	77.8	60.0
Reheat	0.0	0	0.0	0.0	Return	3,495	3,495	No. People	8	Runarnd	75.0	70.0
Humidif	0.0	0	0.0	0.0	Exhaust	524	524	Htg % OA	15.0	Fn MtrTD	0.0	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	1.02	Fn BldTD	0.0	0.0
Total	-405.8				Auxil	0	0	Htg Btuh/SqFt	-118.65	Fn Frict	0.1	0.0

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***** COOLING COIL PEAK ***** CLG SPACE PEAK ***** HEATING COIL PEAK *****
Peaked at Time ==>      Mo/Hr:  7/13      *      Mo/Hr:  7/13      *      Mo/Hr: 13/ 1
Outside Air ==>      OADB/WB/HR: 92/ 77/124.0  *      OADB: 92      *      OADB:  3
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	Space	Ret. Air	Ret. Air	Net	Percent	*	Space	Percent	*	Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	9,092	0		9,092	14.73	*	9,092	24.62	*	-7,558	-7,558	11.26
Glass Solar	11,484	0		11,484	18.60	*	11,484	31.09	*	0	0	0.00
Glass Cond	1,685	0		1,685	2.73	*	1,685	4.56	*	-8,681	-8,681	12.93
Wall Cond	4,968	0		4,968	8.05	*	4,968	13.45	*	-8,876	-8,876	13.22
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	-3,053	-3,053	4.55
Infiltration	6,399			6,399	10.37	*	2,457	6.65	*	-9,962	-9,962	14.84
Sub Total==>	33,627	0		33,627	54.48	*	29,685	80.37	*	-38,129	-38,129	56.78
Internal Loads						*			*			
Lights	4,888	0		4,888	7.92	*	4,888	13.23	*	0	0	0.00
People	3,186			3,186	5.16	*	1,698	4.60	*	0	0	0.00
Misc	192	0	0	192	0.31	*	192	0.52	*	0	0	0.00
Sub Total==>	8,266	0	0	8,266	13.39	*	6,778	18.35	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	18,922	30.65	*	0	0.00	*	0	-29,460	43.87
Sup. Fan Heat				442	0.72	*		0.00	*		442	-0.66
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
CV/UNDR Sizing	471			471	0.76	*	471	1.28	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
						*			*			
Grand Total==>	42,364	0	0	61,728	100.00	*	35,935	100.00	*	-38,129	-67,147	100.00

### COOLING COIL SELECTION

COOLING COIL SECTION													HEATING COIL SECTION			FAN SECTION		
	Total Capacity		Sense Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)					
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor							
Main Clg	9.4	113.1	81.8	2,760	77.5	67.1	88.2	62.2	53.9	51.6	Part	1,638						
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	68						
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	1,200	0	0				
Totals	9.4	113.1									Wall	918	198	22				

**--AREAS**

### HEATING COIL SELECTION

	Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F
Main Htg	-107.0	2,760	46.4	82.9
Aux Htg	0.0	0	0.0	0.0
Preheat	-6.7	2,760	60.0	62.2
Reheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-107.0			

## -AIRFLOWS (cfm)

Type	Cooling	Heating
Vent	414	414
Infil	140	140
Supply	2,760	2,760
Mincfm	0	0
Return	2,760	2,760
Exhaust	414	414
Rm Exh	0	0
Auxil	0	0

--ENGINEERING CHECKS--

Clg % OA	15.0
Clg Cfm/Sqft	2.30
Clg Cfm/Ton	292.84
Clg Sqft/Ton	127.32
Clg Btuh/Sqft	94.25
No. People	12
Htg % OA	15.0
Htg Cfm/Sqft	2.30
Htg Btuh/Sqft	-89.17

--TEMPERATURES (F)--

Type	Clg	Htg
SADB	62.4	83.0
Plenum	75.0	70.0
Return	75.0	70.0
Ret/OA	77.5	60.0
Runarnd	75.0	70.0
Fn MtrTD	0.1	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.1	0.0

System 4 Block MZ - MULTIZONE

***** COOLING COIL PEAK *****						CLG SPACE PEAK *****			HEATING COIL PEAK *****			
Mo/Hr: 7/17						Mo/Hr: 7/17			Mo/Hr: 13/ 1			
Peaked at Time ==>						OADB: 92			OADB: 3			
Outside Air ==>												
	Space	Ret. Air	Ret. Air	Net	Percnt		Space	Percnt		Space Peak	Coil Peak	Percnt
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	110,942	0		110,942	25.86	*	103,972	38.62	*	-90,981	-90,981	8.29
Glass Solar	11,610	0		11,610	2.71	*	15,936	5.92	*	0	0	0.00
Glass Cond	3,477	0		3,477	0.81	*	2,886	1.07	*	-13,946	-13,946	1.27
Wall Cond	26,006	0		26,006	6.06	*	29,262	10.87	*	-44,842	-44,842	4.09
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	-13,198	-13,198	1.20
Infiltration	23,648			23,648	5.51	*	8,862	3.29	*	-40,347	-40,347	3.68
Sub Total==>	175,682	0		175,682	40.95	*	160,917	59.76	*	-203,313	-203,313	18.53
Internal Loads												
Lights	48,700	0		48,700	11.35	*	50,753	18.85	*	0	0	0.00
People	30,768			30,768	7.17	*	13,728	5.10	*	0	0	0.00
Misc	37,461	0	0	37,461	8.73	*	42,971	15.96	*	0	0	0.00
Sub Total==>	116,930	0	0	116,930	27.25	*	107,453	39.91	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	-221,802	20.22
Outside Air	0	0	0	130,000	30.30	*	0	0.00	*		5,541	-0.51
Sup. Fan Heat				5,541	1.29	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	882			882	0.21	*	882	0.33	*	-677,403	-677,403	61.75
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	-0.00	*		0.00	*		0	0.00
Grand Total==>	293,494	0	0	429,035	100.00	*	269,252	100.00	*	-880,716	-1,096,977	100.00

-----COOLING COIL SELECTION-----										-----AREAS-----			
Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (cfm)	Entering DB/WB/HR			Leaving DB/WB/HR				Gross Total	Glass (sf)	Grains (%)	
			Deg F	Deg F	Grains	Deg F	Deg F	Grains		Floor			
Main Clg	80.0	960.0	77.5	66.7	86.1	62.5	51.4	41.4		14,446			
Aux Clg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		Part	13,707		
Opt Vent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		ExFlr	294		
Totals	80.0	960.0								Roof	14,446	0	0
										Wall	3,955	318	8

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	15.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	3,117	3,117	Clg Cfm/Sqft	1.44	SADB	62.8	109.9
Main Htg	-547.5	20,780	85.1	109.9	Infil	567	567	Clg Cfm/Ton	259.75	Plenum	75.0	70.0
Aux Htg	0.0	0	0.0	0.0	Supply	20,780	20,780	Clg Sqft/Ton	180.57	Return	75.0	70.0
Preheat	-57.4	20,780	60.0	62.5	Mincfm	0	0	Clg Btuh/Sqft	66.45	Ret/OA	77.5	60.0
Reheat	0.0	0	0.0	0.0	Return	20,780	20,780	No. People	122	Runarnd	75.0	70.0
Humidif	0.0	0	0.0	0.0	Exhaust	3,117	3,117	Htg % OA	15.0	Fn MtrTD	0.1	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	1.44	Fn BldTD	0.1	0.0
Total	-604.9				Auxil	0	0	Htg Btuh/SqFt	-41.87	Fn Frict	0.2	0.0

MAIN SYSTEM COOLING - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- P E A K C O O L I N G L O A D S -----  
(Main System)

		Space							Coil								
		Peak	OA	Rm	Supp.	Space	Space	Space	Peak	OA	Rm	Supp.	Coil	Coil	Coil		
		Time	Cond.	Dry	Dry	Air	Sens.	Lat.	Time	Cond.	Dry	Dry	Air	Sens.	Lat.		
Room		Mo/Hr	DB/WE	Blb	Bulb	Flow	Load	Load	Mo/Hr	DB/WE	Blb	Bulb	Flow	Load	Load		
Number	Description		(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		
1	STORE-BARBER	7/16	93	77	75	52.1	1,785	43,414	9,367	7/16	93	77	75	52.1	1,785	48,815	20,346
Zone	1 Total/Ave.		93	77	75	52.1	1,785	43,414	9,367		93	77	75	52.1	1,785	48,815	20,346
Zone	1 Block	7/16	93	77	75	52.1	1,785	43,414	9,367	7/16	93	77	75	52.1	1,785	48,815	20,346
System	1 Total/Ave.		93	77	75	52.1	1,785	43,414	9,367		93	77	75	52.1	1,785	48,815	20,346
System	1 Block	7/16	93	77	75	52.1	1,785	43,414	9,367	7/16	93	77	75	52.1	1,785	48,815	20,346
2	ADMIN. OFFICES	7/15	94	78	75	56.9	3,495	67,218	8,834	7/15	94	78	75	56.9	3,495	78,170	28,085
Zone	2 Total/Ave.		94	78	75	56.9	3,495	67,218	8,834		94	78	75	56.9	3,495	78,170	28,085
Zone	2 Block	7/15	94	78	75	56.9	3,495	67,218	8,834	7/15	94	78	75	56.9	3,495	78,170	28,085
System	2 Total/Ave.		94	78	75	56.9	3,495	67,218	8,834		94	78	75	56.9	3,495	78,170	28,085
System	2 Block	7/15	94	78	75	56.9	3,495	67,218	8,834	7/15	94	78	75	56.9	3,495	78,170	28,085
3	COCKTAIL LOUNGE	7/13	92	77	75	62.4	2,760	36,935	5,430	7/13	92	77	75	62.4	2,760	44,642	17,086
Zone	3 Total/Ave.		92	77	75	62.4	2,760	36,935	5,430		92	77	75	62.4	2,760	44,642	17,086
Zone	3 Block	7/13	92	77	75	62.4	2,760	36,935	5,430	7/13	92	77	75	62.4	2,760	44,642	17,086
System	3 Total/Ave.		92	77	75	62.4	2,760	36,935	5,430		92	77	75	62.4	2,760	44,642	17,086
System	3 Block	7/13	92	77	75	62.4	2,760	36,935	5,430	7/13	92	77	75	62.4	2,760	44,642	17,086
4	BAR - GAME ROOM	7/18	89	75	75	62.8	4,540	58,826	8,024	7/15	94	78	75	64.2	4,540	67,219	26,264
5	BALL ROOM	7/17	92	76	75	62.8	10,860	140,716	3,250	7/15	94	78	75	63.8	10,860	164,782	47,096
6	DINING ROOM	7/13	92	77	75	62.8	3,810	49,367	13,607	7/13	92	77	75	62.8	3,810	60,413	30,116
7	KITCHEN	7/18	89	75	75	62.8	1,570	20,343	10,724	7/18	89	75	75	62.8	1,570	24,332	16,351
Zone	4 Total/Ave.		92	76	75	62.8	20,780	269,252	35,605		92	76	75	63.6	20,780	316,746	119,828
Zone	4 Block	7/17	92	76	75	63.3	20,780	259,051	34,443	7/17	92	76	75	63.3	20,780	320,043	108,992
System	4 Total/Ave.		92	76	75	62.8	20,780	269,252	35,605		92	76	75	63.6	20,780	316,746	119,828
System	4 Block	7/17	92	76	75	63.3	20,780	259,051	34,443	7/17	92	76	75	63.3	20,780	320,043	108,992

MAIN SYSTEM HEATING - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- P E A K   H E A T I N G   L O A D S -----  
(Main System)

		Space						Coil							
		Peak	OA	Rm	Supp.	Space	Space	Peak	OA	Rm	Supp.	Coil	Coil		
		Floor	Time	Cond.	Dry	Dry	Air	Sens.	Time	Cond.	Dry	Dry	Air	Sens.	
Room	Area	Mo/Hr	DB/WB	Blb	Bulb	Flow	Load	Mo/Hr	DB/WB	Blb	Bulb	Flow	Load		
Number	Description	(Sq Ft)	(F)	(F)	(F)	(Cfm)	(Btuh)	(F)	(F)	(F)	(F)	(Cfm)	(Btuh)		
1	STORE-BARBER	2,187	13/ 1	3	1 70	96.2	1,785	-49,712	13/ 1	3	1 70	96.2	1,785	-68,574	
Zone	1 Total/Ave.	2,187		3	1 70	96.2	1,785	-49,712		3	1 70	96.2	1,785	-68,574	
Zone	1 Block	2,187	13/ 1	3	1 70	96.2	1,785	-49,712	13/ 1	3	1 70	96.2	1,785	-68,574	
System	1 Total/Ave.	2,187		3	1 70	96.2	1,785	-49,712		3	1 70	96.2	1,785	-68,574	
System	1 Block	2,187	13/ 1	3	1 70	96.2	1,785	-49,712	13/ 1	3	1 70	96.2	1,785	-68,574	
2	ADMIN. OFFICES	3,420	13/ 1	3	1 70	86.1	3,495	-59,652	13/ 1	3	1 70	86.1	3,495	-96,584	
Zone	2 Total/Ave.	3,420		3	1 70	86.1	3,495	-59,652		3	1 70	86.1	3,495	-96,584	
Zone	2 Block	3,420	13/ 1	3	1 70	86.1	3,495	-59,652	13/ 1	3	1 70	86.1	3,495	-96,584	
System	2 Total/Ave.	3,420		3	1 70	86.1	3,495	-59,652		3	1 70	86.1	3,495	-96,584	
System	2 Block	3,420	13/ 1	3	1 70	86.1	3,495	-59,652	13/ 1	3	1 70	86.1	3,495	-96,584	
3	COCKTAIL LOUNGE	1,200	13/ 1	3	1 70	83.0	2,760	-38,129	13/ 1	3	1 70	83.0	2,760	-67,147	
Zone	3 Total/Ave.	1,200		3	1 70	83.0	2,760	-38,129		3	1 70	83.0	2,760	-67,147	
Zone	3 Block	1,200	13/ 1	3	1 70	83.0	2,760	-38,129	13/ 1	3	1 70	83.0	2,760	-67,147	
System	3 Total/Ave.	1,200		3	1 70	83.0	2,760	-38,129		3	1 70	83.0	2,760	-67,147	
System	3 Block	1,200	13/ 1	3	1 70	83.0	2,760	-38,129	13/ 1	3	1 70	83.0	2,760	-67,147	
4	BAR - GAME ROOM	2,444	13/ 1	3	1 70	109.9	4,540	-192,418	13/ 1	3	1 70	109.9	4,540	-227,135	
5	BALL ROOM	7,015	13/ 1	3	1 70	109.9	10,860	-460,278	13/ 1	3	1 70	109.9	10,860	-543,323	
6	DINING ROOM	1,840	13/ 1	3	1 70	109.9	3,810	-161,479	13/ 1	3	1 70	109.9	3,810	-190,613	
7	KITCHEN	3,147	13/ 1	3	1 70	109.9	1,570	-66,541	13/ 1	3	1 70	109.9	1,570	-78,547	
Zone	4 Total/Ave.	14,446		3	1 70	109.9	20,780	-880,716		3	1 70	109.9	20,780	-1,039,619	
Zone	4 Block	14,446	13/ 1	3	1 70	109.9	20,780	-880,716	13/ 1	3	1 70	109.9	20,780	-1,039,619	
System	4 Total/Ave.	14,446		3	1 70	109.9	20,780	-880,716		3	1 70	109.9	20,780	-1,039,619	
System	4 Block	14,446	13/ 1	3	1 70	109.9	20,780	-880,716	13/ 1	3	1 70	109.9	20,780	-1,039,619	

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- INTERNAL COOLING LOADS -----  
(At time of Coil Peak)

Room Number	Description	Lights		People		Misc.		Misc.		Misc.		Total (Btuh)
		Sensible (Btuh)	Ret. Air Lites (Btuh)	Sensible (Btuh)	Latent (Btuh)	Space (Btuh)	Latent (Btuh)	Space (Btuh)	Latent (Btuh)	Sensible (Btuh)	CLF	
1	STORE-BARBER	9,679	0 1.000	2,419	1,740 0.976	0	0	0 0.000	0 0.000	13,838		
Zone	1 Total/Ave.	9,679	0 1.000	2,419	1,740 0.976	0	0	0 0.000	0 0.000	13,838		
Zone	1 Block	9,679	0 1.000	2,419	1,740 0.976	0	0	0 0.000	0 0.000	13,838		
System	1 Total/Ave.	9,679	0 1.000	2,419	1,740 0.976	0	0	0 0.000	0 0.000	13,838		
System	1 Block	9,679	0 1.000	2,419	1,740 0.976	0	0	0 0.000	0 0.000	13,838		
2	ADMIN. OFFICES	12,574	0 0.970	1,720	1,600 0.922	7,458	0	0 1.000	0 1.000	23,352		
Zone	2 Total/Ave.	12,574	0 0.970	1,720	1,600 0.922	7,458	0	0 1.000	0 1.000	23,352		
Zone	2 Block	12,574	0 0.970	1,720	1,600 0.922	7,458	0	0 1.000	0 1.000	23,352		
System	2 Total/Ave.	12,574	0 0.970	1,720	1,600 0.922	7,458	0	0 1.000	0 1.000	23,352		
System	2 Block	12,574	0 0.970	1,720	1,600 0.922	7,458	0	0 1.000	0 1.000	23,352		
3	COCKTAIL LOUNGE	4,888	0 0.770	1,698	1,488 0.746	192	0	0 0.500	0 0.500	8,266		
Zone	3 Total/Ave.	4,888	0 0.770	1,698	1,488 0.746	192	0	0 0.500	0 0.500	8,266		
Zone	3 Block	4,888	0 0.770	1,698	1,488 0.746	192	0	0 0.500	0 0.500	8,266		
System	3 Total/Ave.	4,888	0 0.770	1,698	1,488 0.746	192	0	0 0.500	0 0.500	8,266		
System	3 Block	4,888	0 0.770	1,698	1,488 0.746	192	0	0 0.500	0 0.500	8,266		
4	BAR - GAME ROOM	3,311	0 0.470	2,314	620 0.351	1,430	0	0 0.750	0 0.750	7,675		
5	BALL ROOM	3,125	0 0.100	0	0 0.000	0	0	0 0.000	0 0.000	3,125		
6	DINING ROOM	5,677	0 0.880	6,210	10,400 0.755	0	0	0 0.000	0 0.000	22,287		
7	KITCHEN	18,676	0 1.000	2,750	4,750 1.000	41,942	0	0 1.380	0 1.380	68,118		
Zone	4 Total/Ave.	30,788	0 0.485	11,274	15,770 0.642	43,372	0	0 1.343	0 1.343	101,204		
Zone	4 Block	48,700	0 0.768	9,886	20,882 0.486	37,461	0	0 1.160	0 1.160	116,930		
System	4 Total/Ave.	30,788	0 0.485	11,274	15,770 0.642	43,372	0	0 1.343	0 1.343	101,204		
System	4 Block	48,700	0 0.768	9,886	20,882 0.486	37,461	0	0 1.160	0 1.160	116,930		

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- I N T E R N A L   C O O L I N G   L O A D S -----

(At time of Space Peak)

Room Number	Description	Lights Room		People Sensible	People Latent	People CLF	Misc. Space		Misc. Latent	Misc. Ret. Air		Total (Btuh)
		Sensible (Btuh)	CLF (Btuh)				Sensible (Btuh)	CLF (Btuh)		Sensible (Btuh)	CLF (Btuh)	
1	STORE-BARBER	9,679	0 1.000	2,419	1,740	0.976	0		0	0 0.000		13,838
Zone	1 Total/Ave.	9,679	0 1.000	2,419	1,740	0.976	0		0	0 0.000		13,838
Zone	1 Block	9,679	0 1.000	2,419	1,740	0.976	0		0	0 0.000		13,838
System	1 Total/Ave.	9,679	0 1.000	2,419	1,740	0.976	0		0	0 0.000		13,838
System	1 Block	9,679	0 1.000	2,419	1,740	0.976	0		0	0 0.000		13,838
2	ADMIN. OFFICES	12,574	0 0.970	1,720	1,600	0.922	7,458		0	0 1.000		23,352
Zone	2 Total/Ave.	12,574	0 0.970	1,720	1,600	0.922	7,458		0	0 1.000		23,352
Zone	2 Block	12,574	0 0.970	1,720	1,600	0.922	7,458		0	0 1.000		23,352
System	2 Total/Ave.	12,574	0 0.970	1,720	1,600	0.922	7,458		0	0 1.000		23,352
System	2 Block	12,574	0 0.970	1,720	1,600	0.922	7,458		0	0 1.000		23,352
3	COCKTAIL LOUNGE	4,888	0 0.770	1,698	1,488	0.746	192		0	0 0.500		8,266
Zone	3 Total/Ave.	4,888	0 0.770	1,698	1,488	0.746	192		0	0 0.500		8,266
Zone	3 Block	4,888	0 0.770	1,698	1,488	0.746	192		0	0 0.500		8,266
System	3 Total/Ave.	4,888	0 0.770	1,698	1,488	0.746	192		0	0 0.500		8,266
System	3 Block	4,888	0 0.770	1,698	1,488	0.746	192		0	0 0.500		8,266
4	BAR - GAME ROOM	5,776	0 0.820	3,575	3,102	0.799	1,030		0	0 0.540		13,483
5	BALL ROOM	20,625	0 0.660	1,192	3,250	0.151	0		0	0 0.000		25,067
6	DINING ROOM	5,677	0 0.880	6,210	10,400	0.755	0		0	0 0.000		22,287
7	KITCHEN	18,676	0 1.000	2,750	4,750	1.000	41,942		0	0 1.330		128,955
Zone	4 Total/Ave.	50,753	0 0.800	13,728	21,502	0.587	42,971		0	0 1.160		116,930
Zone	4 Block	48,700	0 0.768	9,886	20,882	0.486	37,461		0	0 1.160		116,930
System	4 Total/Ave.	50,753	0 0.800	13,728	21,502	0.587	42,971		0	0 1.330		128,955
System	4 Block	48,700	0 0.768	9,886	20,882	0.486	37,461		0	0 1.160		116,930

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

(Roof - Skylight)

(At time of Coil Peak)

		Roof		Roof		Skylight			Skylight		Skylight	
		Return Air	Roof	Space	Roof	Skylight	Skylight	Skylt	Return Air	Skylt	Space	Skylt
		Sensible	R.A.	Sensible	Space	Return Air	Space	Solar	Conduction	R.A.	Conduction	Space
Room		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Load	CLTD	Load	CLTD
Number	Description	(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)
1	STORE-BARBER	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
Zone	1 Total/Ave.	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
Zone	1 Block	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
System	1 Total/Ave.	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
System	1 Block	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
2	ADMIN. OFFICES	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
Zone	2 Total/Ave.	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
Zone	2 Block	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
System	2 Total/Ave.	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
System	2 Block	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
3	COCKTAIL LOUNGE	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
Zone	3 Total/Ave.	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
Zone	3 Block	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
System	3 Total/Ave.	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
System	3 Block	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
4	BAR - GAME ROOM	0	0.0	21,205	92.3	0	0	0.000	0	0.0	0	0.0
5	BALL ROOM	0	0.0	60,864	92.3	0	0	0.000	0	0.0	0	0.0
6	DINING ROOM	0	0.0	13,941	80.6	0	0	0.000	0	0.0	0	0.0
7	KITCHEN	0	0.0	20,352	68.8	0	0	0.000	0	0.0	0	0.0
Zone	4 Total/Ave.	0	0.0	116,361	85.7	0	0	0.000	0	0.0	0	0.0
Zone	4 Block	0	0.0	110,942	81.7	0	0	0.000	0	0.0	0	0.0
System	4 Total/Ave.	0	0.0	116,361	85.7	0	0	0.000	0	0.0	0	0.0
System	4 Block	0	0.0	110,942	81.7	0	0	0.000	0	0.0	0	0.0

----- B U I L D I N G   E N V E L O P E   C O O L I N G   L O A D S -----

(Wall - Window)

(At time of Coil Peak)

		Wall	Wall	Wall	Wall	Glass	Glass	Glass	Glass	Glass	Glass	Glass		
		Plenum	Plenn	Space	Space	Space	Return	Air	Solar	Space	Space	Return	Air	R.A.
Room		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Conduction	CLTD	Conduction	CLTD		
Number	Description	(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)		
1	STORE-BARBER	0	0.0	7,474	30.3	1,166		0	0.370	412	18.2		0	0.0
Zone	1 Total/Ave.	0	0.0	7,474	30.3	1,166		0	0.370	412	18.2		0	0.0
Zone	1 Block	0	0.0	7,474	30.3	1,166		0	0.370	412	18.2		0	0.0
System	1 Total/Ave.	0	0.0	7,474	30.3	1,166		0	0.370	412	18.2		0	0.0
System	1 Block	0	0.0	7,474	30.3	1,166		0	0.370	412	18.2		0	0.0
2	ADMIN. OFFICES	0	0.0	8,805	38.1	1,974		0	0.210	1,039	17.8		0	0.0
Zone	2 Total/Ave.	0	0.0	8,805	38.1	1,974		0	0.210	1,039	17.8		0	0.0
Zone	2 Block	0	0.0	8,805	38.1	1,974		0	0.210	1,039	17.8		0	0.0
System	2 Total/Ave.	0	0.0	8,805	38.1	1,974		0	0.210	1,039	17.8		0	0.0
System	2 Block	0	0.0	8,805	38.1	1,974		0	0.210	1,039	17.8		0	0.0
3	COCKTAIL LOUNGE	0	0.0	4,968	37.5	11,484		0	0.650	1,685	13.7		0	0.0



COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----											
(Wall - Window)											
(At time of Coil Peak)											
Room		Wall	Wall	Wall	Wall	Glass	Glass	Glass	Glass	Glass	Glass
Number	Description	Plenum	Plenum	Space	Space	Space	Return Air	Solar	Space	Space	Return Air
		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Conduction	CLTD	Conduction
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)
Zone	3 Total/Ave.	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0
Zone	3 Block	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0
System	3 Total/Ave.	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0
System	3 Block	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0
4	BAR - GAME ROOM	0	0.0	5,542	20.1	3,888	0	0.400	1,194	17.8	0
5	BALL ROOM	0	0.0	0	0.0	0	0	0.000	0	0.0	0
6	DINING ROOM	0	0.0	2,376	37.1	6,912	0	0.580	1,633	13.7	0
7	KITCHEN	0	0.0	15,554	47.2	1,140	0	0.670	180	16.0	0
Zone	4 Total/Ave.	0	0.0	23,471	35.1	11,940	0	0.512	3,007	15.2	0
Zone	4 Block	0	0.0	26,006	38.9	11,610	0	0.501	3,477	17.6	0
System	4 Total/Ave.	0	0.0	23,471	35.1	11,940	0	0.512	3,007	15.2	0
System	4 Block	0	0.0	26,006	38.9	11,610	0	0.501	3,477	17.6	0

----- BUILDING ENVELOPE COOLING LOADS -----											
(Exposed Floor - Partitions - Infiltration)											
(At time of Coil Peak)											
Room		Exposed	Exposed	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope
Number	Description	Sensible	CLTD	Sensible	CLTD	Airflow	Sensible	Latent	Dry B	Sensible	Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
1	STORE-BARBER	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
Zone	1 Total/Ave.	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
Zone	1 Block	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
System	1 Total/Ave.	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
System	1 Block	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
2	ADMIN. OFFICES	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
Zone	2 Total/Ave.	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
Zone	2 Block	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
System	2 Total/Ave.	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
System	2 Block	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
3	COCKTAIL LOUNGE	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
Zone	3 Total/Ave.	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
Zone	3 Block	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
System	3 Total/Ave.	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
System	3 Block	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
4	BAR - GAME ROOM	0	0.0	0	0.0	206	4,157	5,956	75.0	0	41,941
5	BALL ROOM	0	0.0	0	0.0	0	0	0	75.0	0	60,864
6	DINING ROOM	0	0.0	0	0.0	111	1,948	3,207	75.0	0	30,016
7	KITCHEN	0	0.0	0	0.0	250	3,790	5,974	75.0	0	46,989
Zone	4 Total/Ave.	0	0.0	0	0.0	567	9,895	15,136	75.0	0	179,810
Zone	4 Block	0	0.0	0	0.0	567	10,087	13,561	75.0	0	175,682
System	4 Total/Ave.	0	0.0	0	0.0	567	9,895	15,136	75.0	0	179,810
System	4 Block	0	0.0	0	0.0	567	10,087	13,561	75.0	0	175,682

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----												
(Roof - Skylight)												
(At time of Space Peak)												
Room Number	Description	Roof		Roof		Skylight		Skylt Solar CLF	Skylight		Skylight	
		Return Air Sensible Load (Btuh)	R.A. CLTD (F)	Space Sensible Load (Btuh)	Space CLTD (F)	Return Air Solar (Btuh)	Space Solar (Btuh)		Return Air Conduction Load (Btuh)	Skylt R.A. CLTD (F)	Space Conduction Load (Btuh)	Skylt Space CLTD (F)
1	STORE-BARBER	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
Zone	1 Total/Ave.	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
Zone	1 Block	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
System	1 Total/Ave.	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
System	1 Block	0	0.0	18,461	89.8	0	0	0.000	0	0.0	0	0.0
2	ADMIN. OFFICES	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
Zone	2 Total/Ave.	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
Zone	2 Block	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
System	2 Total/Ave.	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
System	2 Block	0	0.0	29,673	92.3	0	0	0.000	0	0.0	0	0.0
3	COCKTAIL LOUNGE	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
Zone	3 Total/Ave.	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
Zone	3 Block	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
System	3 Total/Ave.	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
System	3 Block	0	0.0	9,092	80.6	0	0	0.000	0	0.0	0	0.0
4	BAR - GAME ROOM	0	0.0	15,806	68.8	0	0	0.000	0	0.0	0	0.0
5	BALL ROOM	0	0.0	53,874	81.7	0	0	0.000	0	0.0	0	0.0
6	DINING ROOM	0	0.0	13,941	80.6	0	0	0.000	0	0.0	0	0.0
7	KITCHEN	0	0.0	20,352	68.8	0	0	0.000	0	0.0	0	0.0
Zone	4 Total/Ave.	0	0.0	103,972	76.6	0	0	0.000	0	0.0	0	0.0
Zone	4 Block	0	0.0	110,942	81.7	0	0	0.000	0	0.0	0	0.0
System	4 Total/Ave.	0	0.0	103,972	76.6	0	0	0.000	0	0.0	0	0.0
System	4 Block	0	0.0	110,942	81.7	0	0	0.000	0	0.0	0	0.0

----- BUILDING ENVELOPE COOLING LOADS -----												
(Wall - Window)												
(At time of Space Peak)												
Room Number	Description	Wall		Wall		Glass		Glass Solar CLF	Glass		Glass	
		Plenum Load (Btuh)	Plenn CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)		Space Conduction Load (Btuh)	Glass CLTD (F)	Return Air Conduction Load (Btuh)	Glass R.A. CLTD (F)
1	STORE-BARBER	0	0.0	7,474	30.3	1,166	0	0.370	412	18.2	0	0.0
Zone	1 Total/Ave.	0	0.0	7,474	30.3	1,166	0	0.370	412	18.2	0	0.0
Zone	1 Block	0	0.0	7,474	30.3	1,166	0	0.370	412	18.2	0	0.0
System	1 Total/Ave.	0	0.0	7,474	30.3	1,166	0	0.370	412	18.2	0	0.0
System	1 Block	0	0.0	7,474	30.3	1,166	0	0.370	412	18.2	0	0.0
2	ADMIN. OFFICES	0	0.0	8,805	38.1	1,974	0	0.210	1,039	17.8	0	0.0
Zone	2 Total/Ave.	0	0.0	8,805	38.1	1,974	0	0.210	1,039	17.8	0	0.0
Zone	2 Block	0	0.0	8,805	38.1	1,974	0	0.210	1,039	17.8	0	0.0
System	2 Total/Ave.	0	0.0	8,805	38.1	1,974	0	0.210	1,039	17.8	0	0.0
System	2 Block	0	0.0	8,805	38.1	1,974	0	0.210	1,039	17.8	0	0.0
3	COCKTAIL LOUNGE	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0	0.0

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----  
(Wall - Window)  
(At time of Space Peak)

Room Number	Description	Wall Plenum Load (Btuh)	Wall Plenum CLTD (F)	Wall Space Load (Btuh)	Wall Space CLTD (F)	Glass Space Solar (Btuh)	Glass Return Air Solar (Btuh)	Glass Solar CLF	Glass Space Conduction (Btuh)	Glass Space CLTD (F)	Glass Return Air Conduction (Btuh)	Glass R.A. CLTD (F)
Zone	3 Total/Ave.	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0	0.0
Zone	3 Block	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0	0.0
System	3 Total/Ave.	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0	0.0
System	3 Block	0	0.0	4,968	37.5	11,484	0	0.650	1,685	13.7	0	0.0
	4 BAR - GAME ROOM	0	0.0	11,332	41.1	7,884	0	0.820	1,073	16.0	0	0.0
	5 BALL ROOM	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
	6 DINING ROOM	0	0.0	2,376	37.1	6,912	0	0.580	1,633	13.7	0	0.0
	7 KITCHEN	0	0.0	15,554	47.2	1,140	0	0.670	180	16.0	0	0.0
Zone	4 Total/Ave.	0	0.0	29,262	43.7	15,936	0	0.686	2,886	14.6	0	0.0
Zone	4 Block	0	0.0	26,006	38.9	11,610	0	0.501	3,477	17.6	0	0.0
System	4 Total/Ave.	0	0.0	29,262	43.7	15,936	0	0.686	2,886	14.6	0	0.0
System	4 Block	0	0.0	26,006	38.9	11,610	0	0.501	3,477	17.6	0	0.0

----- BUILDING ENVELOPE COOLING LOADS -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible (Btuh)	Exposed Floor CLTD (F)	Partition Sensible (Btuh)	Part. CLTD (F)	Infiltr. Airflow (Cfm)	Infiltr. Sensible (Btuh)	Infiltr. Latent (Btuh)	Plenum Dry B Temp. (F)	Ceiling Sensible Load (Btuh)	Envelope Total (Btuh)
1	STORE-BARBER	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
Zone	1 Total/Ave.	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
Zone	1 Block	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
System	1 Total/Ave.	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
System	1 Block	0	0.0	0	0.0	186	3,620	7,627	75.0	0	38,759
	2 ADMIN. OFFICES	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
Zone	2 Total/Ave.	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
Zone	2 Block	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
System	2 Total/Ave.	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
System	2 Block	0	0.0	0	0.0	197	3,975	7,234	75.0	0	52,700
	3 COCKTAIL LOUNGE	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
Zone	3 Total/Ave.	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
Zone	3 Block	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
System	3 Total/Ave.	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
System	3 Block	0	0.0	0	0.0	140	2,457	3,942	75.0	0	33,627
	4 BAR - GAME ROOM	0	0.0	0	0.0	206	3,123	4,922	75.0	0	44,141
	5 BALL ROOM	0	0.0	0	0.0	0	0	0	75.0	0	53,874
	6 DINING ROOM	0	0.0	0	0.0	111	1,948	3,207	75.0	0	30,016
	7 KITCHEN	0	0.0	0	0.0	250	3,790	5,974	75.0	0	46,989
Zone	4 Total/Ave.	0	0.0	0	0.0	567	8,862	14,103	75.0	0	175,020
Zone	4 Block	0	0.0	0	0.0	567	10,087	13,561	75.0	0	175,682
System	4 Total/Ave.	0	0.0	0	0.0	567	8,862	14,103	75.0	0	175,020
System	4 Block	0	0.0	0	0.0	567	10,087	13,561	75.0	0	175,682

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----

(Roof - Skylight)

(At time of Coil Peak)

Room Number	Description	Roof		Roof		Skylight		Skylt Solar CLF	Skylight		Skylight	
		Return Air Sensible Load (Btuh)	Roof R.A. CLTD (F)	Space Sensible Load (Btuh)	Roof Space CLTD (F)	Return Air Solar (Btuh)	Space Solar (Btuh)		Return Air Conduction Load (Btuh)	Skylt R.A. CLTD (F)	Space Conduction Load (Btuh)	Skylt Space CLTD (F)
1	STORE-BARBER	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Block	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Total/Ave.	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Block	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
2	ADMIN. OFFICES	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	2 Total/Ave.	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	2 Block	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
System	2 Total/Ave.	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
System	2 Block	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
3	COCKTAIL LOUNGE	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	3 Total/Ave.	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	3 Block	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
System	3 Total/Ave.	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
System	3 Block	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
4	BAR - GAME ROOM	0	0.0	-15,392	-67.0	0	0	0.000	0	0.0	0	0.0
5	BALL ROOM	0	0.0	-44,180	-67.0	0	0	0.000	0	0.0	0	0.0
6	DINING ROOM	0	0.0	-11,588	-67.0	0	0	0.000	0	0.0	0	0.0
7	KITCHEN	0	0.0	-19,820	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Block	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0
System	4 Total/Ave.	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0
System	4 Block	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0

----- BUILDING ENVELOPE HEATING LOADS -----

(Wall - Window)

(At time of Coil Peak)

Room Number	Description	Wall		Wall		Glass		Glass Solar CLF	Glass		Glass	
		Plenum Load (Btuh)	Plenum CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)		Space Conduction Load (Btuh)	Glass CLTD (F)	Return Air Conduction Load (Btuh)	Glass R.A. CLTD (F)
1	STORE-BARBER	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
Zone	1 Block	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
System	1 Total/Ave.	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
System	1 Block	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
2	ADMIN. OFFICES	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
Zone	2 Total/Ave.	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
Zone	2 Block	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
System	2 Total/Ave.	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
System	2 Block	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
3	COCKTAIL LOUNGE	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0	0.0

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----											
(Wall - Window)											
(At time of Coil Peak)											
Room		Wall	Wall	Wall	Wall	Glass	Glass	Glass	Glass	Glass	Glass
Number	Description	Plenum	Plenum	Space	Space	Space	Return Air	Solar	Space	Space	Return Air
		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Conduction	CLTD	Conduction
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)
											(F)
Zone	3 Total/Ave.	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0
Zone	3 Block	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0
System	3 Total/Ave.	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0
System	3 Block	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0
	4 BAR - GAME ROOM	0	0.0	-18,474	-67.0	0	0	0.000	-4,735	-67.0	0
	5 BALL ROOM	0	0.0	0	0.0	0	0	0.000	0	0.0	0
	6 DINING ROOM	0	0.0	-4,290	-67.0	0	0	0.000	-8,418	-67.0	0
	7 KITCHEN	0	0.0	-22,078	-67.0	0	0	0.000	-793	-67.0	0
Zone	4 Total/Ave.	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0
Zone	4 Block	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0
System	4 Total/Ave.	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0
System	4 Block	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0

----- BUILDING ENVELOPE HEATING LOADS -----											
(Exposed Floor - Partitions - Infiltration)											
(At time of Coil Peak)											
Room		Exposed	Expsd	Partition	Part.	Infilt.	Infilt.	Infilt.	Plenum	Ceiling	Envelope
Number	Description	Sensible	CLTD	Sensible	CLTD	Airflow	Sensible	Latent	Dry B	Sensible	Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
1	STORE-BARBER	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
Zone	1 Total/Ave.	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
Zone	1 Block	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
System	1 Total/Ave.	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
System	1 Block	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
2	ADMIN. OFFICES	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
Zone	2 Total/Ave.	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
Zone	2 Block	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
System	2 Total/Ave.	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
System	2 Block	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
3	COCKTAIL LOUNGE	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
Zone	3 Total/Ave.	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
Zone	3 Block	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
System	3 Total/Ave.	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
System	3 Block	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
4	BAR - GAME ROOM	-5,342	-67.0	0	0.0	206	-14,659	0	70.0	0	-58,601
5	BALL ROOM	0	0.0	0	0.0	0	0	0	70.0	0	-44,181
6	DINING ROOM	-1,796	-67.0	0	0.0	111	-7,899	0	70.0	0	-33,990
7	KITCHEN	-6,060	-67.0	0	0.0	250	-17,790	0	70.0	0	-66,541
Zone	4 Total/Ave.	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313
Zone	4 Block	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313
System	4 Total/Ave.	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313
System	4 Block	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----

(Roof - Skylight)

(At time of Space Peak)

Room Number	Description	Roof		Roof		Skylight		Skylt Solar CLF	Skylight		Skylight	
		Return Air Sensible Load (Btuh)	R.A. CLTD (F)	Space Sensible Load (Btuh)	Space CLTD (F)	Return Air Solar (Btuh)	Space Solar (Btuh)		Return Air Conduction Load (Btuh)	R.A. CLTD (F)	Space Conduction Load (Btuh)	Skylt Space CLTD (F)
1	STORE-BARBER	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Block	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Total/Ave.	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Block	0	0.0	-13,774	-67.0	0	0	0.000	0	0.0	0	0.0
2	ADMIN. OFFICES	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	2 Total/Ave.	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	2 Block	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
System	2 Total/Ave.	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
System	2 Block	0	0.0	-21,539	-67.0	0	0	0.000	0	0.0	0	0.0
3	COCKTAIL LOUNGE	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	3 Total/Ave.	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	3 Block	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
System	3 Total/Ave.	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
System	3 Block	0	0.0	-7,558	-67.0	0	0	0.000	0	0.0	0	0.0
4	BAR - GAME ROOM	0	0.0	-15,392	-67.0	0	0	0.000	0	0.0	0	0.0
5	BALL ROOM	0	0.0	-44,180	-67.0	0	0	0.000	0	0.0	0	0.0
6	DINING ROOM	0	0.0	-11,588	-67.0	0	0	0.000	0	0.0	0	0.0
7	KITCHEN	0	0.0	-19,820	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Block	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0
System	4 Total/Ave.	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0
System	4 Block	0	0.0	-90,981	-67.0	0	0	0.000	0	0.0	0	0.0

----- BUILDING ENVELOPE HEATING LOADS -----

(Wall - Window)

(At time of Space Peak)

Room Number	Description	Wall		Wall		Glass		Glass Solar CLF	Glass		Glass	
		Plenum Load (Btuh)	Plenum CLTD (F)	Space Load (Btuh)	Space CLTD (F)	Space Solar (Btuh)	Return Air Solar (Btuh)		Space Conduction Load (Btuh)	Space CLTD (F)	Return Air Conduction Load (Btuh)	R.A. CLTD (F)
1	STORE-BARBER	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
Zone	1 Block	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
System	1 Total/Ave.	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
System	1 Block	0	0.0	-16,527	-67.0	0	0	0.000	-1,597	-67.0	0	0.0
2	ADMIN. OFFICES	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
Zone	2 Total/Ave.	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
Zone	2 Block	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
System	2 Total/Ave.	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
System	2 Block	0	0.0	-15,484	-67.0	0	0	0.000	-4,121	-67.0	0	0.0
3	COCKTAIL LOUNGE	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0	0.0

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----

(Wall - Window)  
(At time of Space Peak)

Room Number	Description	Wall Plenum Load (Btuh)	Wall Plenum CLTD (F)	Wall Space Load (Btuh)	Wall Space CLTD (F)	Glass Space Solar (Btuh)	Glass Return Air Solar (Btuh)	Glass Solar CLF	Glass Space Conduction (Btuh)	Glass Space CLTD (F)	Glass Return Air Conduction (Btuh)	Glass R.A. CLTD (F)
Zone	3 Total/Ave.	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0	0.0
Zone	3 Block	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0	0.0
System	3 Total/Ave.	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0	0.0
System	3 Block	0	0.0	-8,876	-67.0	0	0	0.000	-8,681	-67.0	0	0.0
4	BAR - GAME ROOM	0	0.0	-18,474	-67.0	0	0	0.000	-4,735	-67.0	0	0.0
5	BALL ROOM	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
6	DINING ROOM	0	0.0	-4,290	-67.0	0	0	0.000	-8,418	-67.0	0	0.0
7	KITCHEN	0	0.0	-22,078	-67.0	0	0	0.000	-793	-67.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0	0.0
Zone	4 Block	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0	0.0
System	4 Total/Ave.	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0	0.0
System	4 Block	0	0.0	-44,842	-67.0	0	0	0.000	-13,946	-67.0	0	0.0

----- BUILDING ENVELOPE HEATING LOADS -----

(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible (Btuh)	Exposed Floor CLTD (F)	Partition Sensible (Btuh)	Part. CLTD (F)	Infiltr. Airflow (Cfm)	Infiltr. Sensible (Btuh)	Infiltr. Latent (Btuh)	Plenum Dry B Temp. (F)	Ceiling Sensible Load (Btuh)	Envelope Total (Btuh)
1	STORE-BARBER	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
Zone	1 Total/Ave.	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
Zone	1 Block	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
System	1 Total/Ave.	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
System	1 Block	-4,579	-67.0	0	0.0	186	-13,236	0	70.0	0	-49,712
2	ADMIN. OFFICES	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
Zone	2 Total/Ave.	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
Zone	2 Block	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
System	2 Total/Ave.	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
System	2 Block	-4,489	-67.0	0	0.0	197	-14,018	0	70.0	0	-59,652
3	COCKTAIL LOUNGE	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
Zone	3 Total/Ave.	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
Zone	3 Block	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
System	3 Total/Ave.	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
System	3 Block	-3,053	-67.0	0	0.0	140	-9,962	0	70.0	0	-38,129
4	BAR - GAME ROOM	-5,342	-67.0	0	0.0	206	-14,659	0	70.0	0	-58,601
5	BALL ROOM	0	0.0	0	0.0	0	0	0	70.0	0	-44,181
6	DINING ROOM	-1,796	-67.0	0	0.0	111	-7,899	0	70.0	0	-33,990
7	KITCHEN	-6,060	-67.0	0	0.0	250	-17,790	0	70.0	0	-66,541
Zone	4 Total/Ave.	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313
Zone	4 Block	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313
System	4 Total/Ave.	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313
System	4 Block	-13,198	-67.0	0	0.0	567	-40,347	0	70.0	0	-203,313

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

AIRFLOW COOLING LOADS  
(At time of Coil Peak)

Room Number	Description	Ventilation			Optional Ventilation			Bypass			Ov/Undr Sizing (Btuh)
		Airflow (Cfm)	Sensible (Btuh)	Latent Airflow (Btuh)	Airflow (Cfm)	Sensible (Btuh)	Latent Airflow (Btuh)	Airflow (Cfm)	Sensible (Btuh)	Latent (Btuh)	
1	STORE-BARBER	268	5,211	10,979	0	0	0	0	0	0	183
Zone	1 Total/Ave.	268	5,211	10,979	0	0	0	0	0	0	183
Zone	1 Block	268	5,211	10,979	0	0	0	0	0	0	183
System	1 Total/Ave.	268	5,211	10,979	0	0	0	0	0	0	183
System	1 Block	268	5,211	10,979	0	0	0	0	0	0	0
2	ADMIN. OFFICES	524	10,579	19,251	0	0	0	0	0	0	0
Zone	2 Total/Ave.	524	10,579	19,251	0	0	0	0	0	0	0
Zone	2 Block	524	10,579	19,251	0	0	0	0	0	0	0
System	2 Total/Ave.	524	10,579	19,251	0	0	0	0	0	0	0
System	2 Block	524	10,579	19,251	0	0	0	0	0	0	0
3	COCKTAIL LOUNGE	414	7,266	11,656	0	0	0	0	0	0	471
Zone	3 Total/Ave.	414	7,266	11,656	0	0	0	0	0	0	471
Zone	3 Block	414	7,266	11,656	0	0	0	0	0	0	471
System	3 Total/Ave.	414	7,266	11,656	0	0	0	0	0	0	471
System	3 Block	414	7,266	11,656	0	0	0	0	0	0	9,226
4	BAR - GAME ROOM	681	13,742	19,688	0	0	0	0	0	0	65,025
5	BALL ROOM	1,629	32,872	47,096	0	0	0	0	0	0	10,671
6	DINING ROOM	572	10,030	16,510	0	0	0	0	0	0	-84,040
7	KITCHEN	235	3,570	5,627	0	0	0	0	0	0	882
Zone	4 Total/Ave.	3,117	60,215	88,921	0	0	0	0	0	0	882
Zone	4 Block	3,117	55,450	74,549	0	0	0	0	0	0	882
System	4 Total/Ave.	3,117	60,215	88,921	0	0	0	0	0	0	882
System	4 Block	3,117	55,450	74,549	0	0	0	0	0	0	882



HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- A I R F L O W H E A T I N G L O A D S -----

(At time of Coil Peak)

		--- Ventilation --		---- Op. Vent.-----	Reheat -----		Humidif. ----		
Room		Airflow	Sensible Airflow	Sensible Airflow	Sensible Airflow	Sensible Airflow	Latent	Total	
Number	Description	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Cfm)	(Btuh)	(Btuh)	
1	STORE-BARBER	268	-19,053	0	0	0	0	0	-19,053
Zone	1 Total/Ave.	268	-19,053	0	0	0	0	0	-19,053
Zone	1 Block	268	-19,053	0	0	0	0	0	-19,053
System	1 Total/Ave.	268	-19,053	0	0	0	0	0	-19,053
System	1 Block	268	-19,053	0	0	0	0	0	-19,053
2	ADMIN. OFFICES	524	-37,305	0	0	0	0	0	-37,305
Zone	2 Total/Ave.	524	-37,305	0	0	0	0	0	-37,305
Zone	2 Block	524	-37,305	0	0	0	0	0	-37,305
System	2 Total/Ave.	524	-37,305	0	0	0	0	0	-37,305
System	2 Block	524	-37,305	0	0	0	0	0	-37,305
3	COCKTAIL LOUNGE	414	-29,460	0	0	0	0	0	-29,460
Zone	3 Total/Ave.	414	-29,460	0	0	0	0	0	-29,460
Zone	3 Block	414	-29,460	0	0	0	0	0	-29,460
System	3 Total/Ave.	414	-29,460	0	0	0	0	0	-29,460
System	3 Block	414	-29,460	0	0	0	0	0	-29,460
4	BAR - GAME ROOM	681	-48,459	0	0	0	0	0	-48,459
5	BALL ROOM	1,629	-115,918	0	0	0	0	0	-115,918
6	DINING ROOM	572	-40,667	0	0	0	0	0	-40,667
7	KITCHEN	235	-16,758	0	0	0	0	0	-16,758
Zone	4 Total/Ave.	3,117	-221,802	0	0	0	0	0	-221,802
Zone	4 Block	3,117	-221,802	0	0	0	0	0	-221,802
System	4 Total/Ave.	3,117	-221,802	0	0	0	0	0	-221,802
System	4 Block	3,117	-221,802	0	0	0	0	0	-221,802

COOLING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- AIRFLOW HEAT GAIN AND LOSS -----

(At time of Coil Peak)

Room Number	Description	Cooling										
		Duct Heat Pickup (Btuh)	Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	System Exhaust Total (Btuh)	Room Exhaust Airflow (Cfm)	Room Exhaust Airflow (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around Corridor Airflow (Cfm)	System Return Airflow (Cfm)
1	STORE-BARBER	0	190	0	0	190	268	0	1,785	0	0	0 1,785
Zone	1 Total/Ave.	0	190	0	0	190	268	0	1,785	0	0	0 1,785
Zone	1 Block	0	190	0	0	190	268	0	1,785	0	0	0 1,785
System	1 Total/Ave.	0	190	0	0	190	268	0	1,785	0	0	0 1,785
System	1 Block	0	190	0	0	190	268	0	1,785	0	0	0 3,495
2	ADMIN. OFFICES	0	373	0	0	373	524	0	3,495	0	0	0 3,495
Zone	2 Total/Ave.	0	373	0	0	373	524	0	3,495	0	0	0 3,495
Zone	2 Block	0	373	0	0	373	524	0	3,495	0	0	0 3,495
System	2 Total/Ave.	0	373	0	0	373	524	0	3,495	0	0	0 3,495
System	2 Block	0	373	0	0	373	524	0	3,495	0	0	0 2,760
3	COCKTAIL LOUNGE	0	442	0	0	442	414	0	2,760	0	0	0 2,760
Zone	3 Total/Ave.	0	442	0	0	442	414	0	2,760	0	0	0 2,760
Zone	3 Block	0	442	0	0	442	414	0	2,760	0	0	0 2,760
System	3 Total/Ave.	0	442	0	0	442	414	0	2,760	0	0	0 2,760
System	3 Block	0	442	0	0	442	414	0	2,760	0	0	0 4,540
4	BAR - GAME ROOM	0	1,211	0	0	1,211	681	0	4,540	0	0	0 10,860
5	BALL ROOM	0	2,896	0	0	2,896	1,629	0	10,860	0	0	0 3,810
6	DINING ROOM	0	1,016	0	0	1,016	572	0	3,810	0	0	0 1,570
7	KITCHEN	0	419	0	0	419	235	0	1,570	0	0	0 20,780
Zone	4 Total/Ave.	0	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780
Zone	4 Block	0	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780
System	4 Total/Ave.	0	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780
System	4 Block	0	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780

HEATING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- AIRFLOW HEAT GAIN AND LOSS -----  
(At time of Coil Peak)

Room Number	Description	Heating									
		Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	System Total (Btuh)	Room Exhaust Airflow (Cfm)	Room Exhaust Airflow (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around Corridor Airflow (Cfm)	System Return Airflow (Cfm)
1	STORE-BARBER	190	0	0	190	268	0	1,785	0	0	0 1,785
Zone	1 Total/Ave.	190	0	0	190	268	0	1,785	0	0	0 1,785
Zone	1 Block	190	0	0	190	268	0	1,785	0	0	0 1,785
System	1 Total/Ave.	190	0	0	190	268	0	1,785	0	0	0 1,785
System	1 Block	190	0	0	190	268	0	1,785	0	0	0 1,785
2	ADMIN. OFFICES	373	0	0	373	524	0	3,495	0	0	0 3,495
Zone	2 Total/Ave.	373	0	0	373	524	0	3,495	0	0	0 3,495
Zone	2 Block	373	0	0	373	524	0	3,495	0	0	0 3,495
System	2 Total/Ave.	373	0	0	373	524	0	3,495	0	0	0 3,495
System	2 Block	373	0	0	373	524	0	3,495	0	0	0 3,495
3	COCKTAIL LOUNGE	442	0	0	442	414	0	2,760	0	0	0 2,760
Zone	3 Total/Ave.	442	0	0	442	414	0	2,760	0	0	0 2,760
Zone	3 Block	442	0	0	442	414	0	2,760	0	0	0 2,760
System	3 Total/Ave.	442	0	0	442	414	0	2,760	0	0	0 2,760
System	3 Block	442	0	0	442	414	0	2,760	0	0	0 2,760
4	BAR - GAME ROOM	1,211	0	0	1,211	681	0	4,540	0	0	0 4,540
5	BALL ROOM	2,896	0	0	2,896	1,629	0	10,860	0	0	0 10,860
6	DINING ROOM	1,016	0	0	1,016	572	0	3,810	0	0	0 3,810
7	KITCHEN	419	0	0	419	235	0	1,570	0	0	0 1,570
Zone	4 Total/Ave.	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780
Zone	4 Block	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780
System	4 Total/Ave.	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780
System	4 Block	5,541	0	0	5,541	3,117	0	20,780	0	0	0 20,780

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C   S T A T E   P O I N T S -----

Zone 1

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	61.2	46.1	62.7	27.8	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	61.2	46.1	62.7	27.8	
Outdoor Air	93.3	77.4	49.9	124.1	41.9	
Return/Outdoor Air Mix	77.7	64.0	48.1	71.9	29.9	
Blow through Fan						0.0
Entering Coil	77.7	64.0	48.1	71.9	29.9	
Leaving Coil	52.0	50.8	92.5	56.1	21.2	
Draw Through Fan						0.0
Duct Frictional Heat						0.1
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	52.1	50.8	92.1	56.1	21.2	
Supply Air	52.1	50.8	92.1	56.1	21.2	
Percent Outside Air		15.00	(%)			
Sensible Heat Ratio (SHR)		0.833				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		1,785	(Cfm)			

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- PSYCHROMETRIC STATE POINTS -----

Zone 2

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	62.5	50.7	69.1	28.8	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	62.5	50.7	69.1	28.8	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	77.8	65.1	51.5	77.3	30.8	
Blow through Fan						0.0
Entering Coil	77.8	65.1	51.5	77.3	30.8	
Leaving Coil	56.8	55.2	90.8	65.7	23.8	
Draw Through Fan						0.0
Duct Frictional Heat						0.1
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	56.9	55.2	90.5	65.7	23.9	
Supply Air	56.9	55.2	90.5	65.7	23.9	
Percent Outside Air	15.00 (%)					
Sensible Heat Ratio (SHR)	0.882					
Percent Supply Air Bypassing Coil	0.00 (%)					
Coil Airflow	3,495 (Cfm)					

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 4109 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C S T A T E P O I N T S -----

Zone 3

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	65.1	59.9	81.9	30.8	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	65.1	59.9	81.9	30.8	
Outdoor Air	91.5	77.0	52.7	124.0	41.5	
Return/Outdoor Air Mix	77.5	67.1	59.3	88.2	32.4	
Blow through Fan						0.0
Entering Coil	77.5	67.1	59.3	88.2	32.4	
Leaving Coil	62.2	60.1	89.0	78.5	27.1	
Draw Through Fan						0.0
Duct Frictional Heat						0.1
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	62.4	60.2	88.5	78.5	27.2	
Supply Air	62.4	60.2	88.5	78.5	27.2	
Percent Outside Air		15.00	(%)			
Sensible Heat Ratio (SHR)		0.846				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		2,760	(Cfm)			

SYSTEM PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 4109 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C S T A T E P O I N T S -----

System 4

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	75.0	64.9	59.1	80.8	30.6	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	75.0	64.9	59.1	80.8	30.6	
Outdoor Air	91.7	75.9	49.3	116.6	40.4	
Return/Outdoor Air Mix	77.5	66.7	57.9	86.1	32.1	
Blow through Fan						0.1
Entering Coil	77.6	66.8	57.8	86.1	32.1	
Leaving Coil	62.6	60.3	87.8	78.4	27.2	
Draw Through Fan						0.0
Duct Frictional Heat						0.2
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	62.8	60.3	87.2	78.4	27.3	
Supply Air	62.8	60.3	87.2	78.4	27.3	
Percent Outside Air		15.00	(%)			
Sensible Heat Ratio (SHR)		0.885				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		20,780	(Cfm)			

BUILDING U-VALUES - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)						Wall	Ceil.	Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr	Wintr	Summr	Wintr	Summr	Wintr				
1	STORE-BARBER	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		46.8	10.02
Zone	1 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		46.8	10.02
System	1 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		46.8	10.02
2	ADMIN. OFFICES	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		46.2	9.89
Zone	2 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		46.2	9.89
System	2 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		46.2	9.89
3	COCKTAIL LOUNGE	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		54.9	11.63
Zone	3 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		54.9	11.63
System	3 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		54.9	11.63
4	BAR - GAME ROOM	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		54.6	11.58
5	BALL ROOM	0.388	0.000	0.000	0.000	0.094	0.000	0.000	0.000	0.000		28.6	6.37
6	DINING ROOM	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		41.9	9.04
7	KITCHEN	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		51.4	10.93
Zone	4 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		39.6	8.58
System	4 Total/Ave.	0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		39.6	8.58
Building		0.388	0.670	0.000	0.000	0.094	0.621	0.655	0.184	0.000		42.3	9.11



BUILDING AREAS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- B U I L D I N G   A R E A S -----													
		Number of		Floor	Total	Exposed		Skylight	Skl	Net Roof	Window	Win	Net Wall
Room		Duplicate		Area/Dupl	Floor	Partition	Floor	Area	/Rf	Area	Area	/Wl	Area
Number	Description	Flr	Rm	(sqft)	(sqft)	(sqft)	(sqft)	(sqft)	(%)	(sqft)	(sqft)	(%)	(sqft)
1	STORE-BARBER	1	1	2,187	2,187	1,512	102	0	0	2,187	36	3	1,341
Zone	1 Total/Ave.				2,187	1,512	102	0	0	2,187	36	3	1,341
System	1 Total/Ave.				2,187	1,512	102	0	0	2,187	36	3	1,341
2	ADMIN. OFFICES	1	1	3,420	3,420	4,122	100	0	0	3,420	94	7	1,256
Zone	2 Total/Ave.				3,420	4,122	100	0	0	3,420	94	7	1,256
System	2 Total/Ave.				3,420	4,122	100	0	0	3,420	94	7	1,256
3	COCKTAIL LOUNGE	1	1	1,200	1,200	1,638	68	0	0	1,200	198	22	720
Zone	3 Total/Ave.				1,200	1,638	68	0	0	1,200	198	22	720
System	3 Total/Ave.				1,200	1,638	68	0	0	1,200	198	22	720
4	BAR - GAME ROOM	1	1	2,444	2,444	3,213	119	0	0	2,444	108	7	1,498
5	BALL ROOM	1	1	7,015	7,015	4,500	0	0	0	7,015	0	0	0
6	DINING ROOM	1	1	1,840	1,840	2,349	40	0	0	1,840	192	36	348
7	KITCHEN	1	1	3,147	3,147	3,645	135	0	0	3,147	18	1	1,791
Zone	4 Total/Ave.				14,446	13,707	294	0	0	14,446	318	8	3,637
System	4 Total/Ave.				14,446	13,707	294	0	0	14,446	318	8	3,637
Building					21,253	20,979	564	0	0	21,253	647	9	6,954

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.094 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.221 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.127 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 7.09 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 13.72 (Btu/Hr/Sq Ft)

Main System 1 SZ SINGLE ZONE

Main System      2   SZ      SINGLE ZONE

[illegible]

Percent	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	0.9	5	80	-40,580	42	1,119	349.5	0	0	0.0	0	0
5 - 10	1.4	8	143	-60,870	27	710	524.3	0	0	0.0	0	0
10 - 15	1.8	4	73	-81,160	0	0	699.0	0	0	0.0	0	0
15 - 20	2.3	4	77	-101,450	0	0	873.8	0	0	0.0	0	0
20 - 25	2.7	7	115	-121,740	0	0	1,048.5	0	0	0.0	0	0
25 - 30	3.2	6	106	-142,030	0	0	1,223.3	0	0	0.0	0	0
30 - 35	3.6	4	74	-162,320	0	0	1,398.0	0	0	0.0	0	0
35 - 40	4.1	10	166	-182,610	0	0	1,572.8	0	0	0.0	0	0
40 - 45	4.5	8	143	-202,900	0	0	1,747.5	0	0	0.0	0	0
45 - 50	5.0	8	133	-223,190	0	0	1,922.3	0	0	0.0	0	0
50 - 55	5.4	9	156	-243,480	0	0	2,097.0	0	0	0.0	0	0
55 - 60	5.9	5	88	-263,770	0	0	2,271.8	0	0	0.0	0	0
60 - 65	6.3	8	132	-284,060	0	0	2,446.5	0	0	0.0	0	0
65 - 70	6.8	2	42	-304,350	0	0	2,621.3	0	0	0.0	0	0
70 - 75	7.3	1	20	-324,640	0	0	2,796.0	0	0	0.0	0	0
75 - 80	7.7	3	60	-344,930	0	0	2,970.8	0	0	0.0	0	0
80 - 85	8.2	0	0	-365,220	0	0	3,145.5	0	0	0.0	0	0
85 - 90	8.6	0	0	-385,510	0	0	3,320.3	0	0	0.0	0	0
90 - 95	9.1	0	0	-405,800	0	0	3,495.0	100	8,760	0.0	0	0
95 - 100	0.0	0	7,038	0	0	6,105	0.0	0	0	0.0	0	8,760
Hours Off												

Main System      3   SZ      SINGLE ZONE

Main System      4   MZ      MULTIZONE

Percent	Cooling Load			Heating Load			Cooling Airflow			Heating Airflow		
Design	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
Load	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	4.0	41	1,314	-30,243	1	60	1,039.0	0	0	0.0	0	0
5 - 10												
10 - 15												
15 - 20												
20 - 25												
25 - 30												
30 - 35												
35 - 40												
40 - 45												
45 - 50												
50 - 55												
55 - 60												
60 - 65												
65 - 70												
70 - 75												
75 - 80												
80 - 85												
85 - 90												
90 - 95												
95 - 100												
Hours Off												

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap.	Hours	Hours	Capacity	Hours	Hours	Cap.	Hours	Hours	Cap.	Hours	Hours
	(Ton)	(%)		(Btuh)	(%)		(Cfm)	(%)		(Cfm)	(%)	
0 - 5	8.0	15	492	-60,486	17	745	2,078.0	0	0	0.0	0	0
5 - 10	12.0	9	288	-90,729	34	1,523	3,117.0	0	0	0.0	0	0
10 - 15	16.0	12	385	-120,972	20	916	4,156.0	0	0	0.0	0	0
15 - 20	20.0	11	338	-151,214	14	624	5,195.0	0	0	0.0	0	0
20 - 25	24.0	7	213	-181,457	13	597	6,234.0	0	0	0.0	0	0
25 - 30	28.0	6	186	-211,700	0	14	7,273.0	0	0	0.0	0	0
30 - 35	32.0	0	0	-241,943	0	0	8,312.0	0	0	0.0	0	0
35 - 40	36.0	0	0	-272,186	0	0	9,351.0	0	0	0.0	0	0
40 - 45	40.0	0	0	-302,429	0	0	10,390.0	0	0	0.0	0	0
45 - 50	44.0	0	0	-332,672	0	0	11,429.0	0	0	0.0	0	0
50 - 55	48.0	0	0	-362,915	0	0	12,468.0	0	0	0.0	0	0
55 - 60	52.0	0	0	-393,157	0	0	13,507.0	0	0	0.0	0	0
60 - 65	56.0	0	0	-423,400	0	0	14,546.0	0	0	0.0	0	0
65 - 70	60.0	0	0	-453,643	0	0	15,585.0	0	0	0.0	0	0
70 - 75	64.0	0	0	-483,886	0	0	16,624.0	0	0	0.0	0	0
75 - 80	68.0	0	0	-514,129	0	0	17,663.0	0	0	0.0	0	0
80 - 85	72.0	0	0	-544,372	0	0	18,702.0	0	0	0.0	0	0
85 - 90	76.0	0	0	-574,615	0	0	19,741.0	0	0	0.0	0	0
90 - 95	80.0	0	0	-604,858	0	0	20,780.0	100	8,760	0.0	0	0
95 - 100	0.0	0	5,544	0	0	4,281	0.0	0	0	0.0	0	8,760

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- SYSTEM LOAD PROFILE -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	5.2	44	1,405	-59,649	16	695	1,441.0	0	0	0.0	0	0
5 - 10	10.3	8	273	-119,297	33	1,490	2,882.0	0	0	0.0	0	0
10 - 15	15.5	9	281	-178,946	22	986	4,323.0	0	0	0.0	0	0
15 - 20	20.6	10	326	-238,594	12	537	5,764.0	0	0	0.0	0	0
20 - 25	25.8	8	260	-298,243	17	755	7,205.0	0	0	0.0	0	0
25 - 30	30.9	6	191	-357,892	0	16	8,646.0	0	0	0.0	0	0
30 - 35	36.1	9	305	-417,540	0	0	10,087.0	0	0	0.0	0	0
35 - 40	41.2	4	115	-477,189	0	0	11,528.0	0	0	0.0	0	0
40 - 45	46.4	2	60	-536,837	0	0	12,969.0	0	0	0.0	0	0
45 - 50	51.6	0	0	-596,486	0	0	14,410.0	0	0	0.0	0	0
50 - 55	56.7	0	0	-656,135	0	0	15,851.0	0	0	0.0	0	0
55 - 60	61.9	0	0	-715,783	0	0	17,292.0	0	0	0.0	0	0
60 - 65	67.0	0	0	-775,432	0	0	18,733.0	0	0	0.0	0	0
65 - 70	72.2	0	0	-835,080	0	0	20,174.0	0	0	0.0	0	0
70 - 75	77.3	0	0	-894,729	0	0	21,615.0	0	0	0.0	0	0
75 - 80	82.5	0	0	-954,378	0	0	23,056.0	0	0	0.0	0	0
80 - 85	87.6	0	0	-1,014,026	0	0	24,497.0	0	0	0.0	0	0
85 - 90	92.8	0	0	-1,073,675	0	0	25,938.0	0	0	0.0	0	0
90 - 95	98.0	0	0	-1,133,323	0	0	27,379.0	0	0	0.0	0	0
95 - 100	103.1	0	0	-1,192,972	0	0	28,820.0	100	8,760	0.0	0	0
Hours Off	0.0	0	5,544	0	0	4,281	0.0	0	0	0.0	0	8,760

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

January			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	24.1	19.9	-299,610	0.0	-259,849	0.0	-273,158	0.0	-272,818	0.0	-265,552	0.0
2	23.4	19.5	-325,976	0.0	-284,890	0.0	-286,894	0.0	-286,562	0.0	-284,102	0.0
3	23.7	20.0	-340,042	0.0	-286,568	0.0	-288,573	0.0	-288,248	0.0	-285,794	0.0
4	24.7	21.1	-350,392	0.0	-285,044	0.0	-295,789	0.0	-295,136	0.0	-292,686	0.0
5	26.3	22.8	-358,314	0.0	-278,127	0.0	-295,471	0.0	-295,141	0.0	-292,695	0.0
6	28.3	25.0	-355,756	0.0	-279,957	0.0	-284,570	0.0	-284,248	0.0	-281,807	0.0
7	30.8	27.9	-347,175	0.0	-261,075	0.0	-264,461	0.0	-264,147	0.0	-261,710	0.0
8	33.5	30.8	-304,503	0.0	-229,143	0.0	-260,718	0.0	-260,350	0.0	-243,762	0.0
9	36.4	33.5	-246,902	0.0	-196,592	0.0	-231,204	0.0	-230,908	0.0	-206,935	0.0
10	39.3	35.6	-196,712	0.0	-176,692	0.0	-208,853	0.0	-208,564	0.0	-178,691	0.0
11	42.1	36.8	-131,815	0.0	-136,264	0.0	-171,371	0.0	-171,089	0.0	-135,319	0.0
12	44.6	37.5	-89,070	0.0	-110,201	0.0	-144,168	0.0	-143,893	0.0	-109,279	0.0
13	46.6	38.2	-66,961	0.0	-85,456	0.0	-116,224	0.0	-115,956	0.0	-84,559	0.0
14	48.2	38.3	-56,154	0.0	-72,022	0.0	-99,040	0.0	-98,778	0.0	-71,144	0.0
15	49.2	39.0	-54,586	0.0	-67,699	0.0	-93,758	0.0	-93,502	0.0	-66,840	0.0
16	49.5	39.1	-57,824	0.0	-66,035	0.0	-92,122	0.0	-91,873	0.0	-65,198	0.0
17	48.8	38.9	-64,296	0.0	-71,398	0.0	-97,495	0.0	-97,252	0.0	-70,582	0.0
18	47.0	38.5	-72,714	0.0	-80,293	0.0	-108,949	0.0	-108,712	0.0	-79,499	0.0
19	44.1	37.3	-82,254	0.0	-92,371	0.0	-124,610	0.0	-124,378	0.0	-91,595	0.0
20	40.5	34.8	-101,512	0.0	-108,446	0.0	-144,521	0.0	-144,295	0.0	-107,688	0.0
21	36.4	31.2	-124,134	0.0	-128,253	0.0	-170,659	0.0	-170,438	0.0	-127,512	0.0
22	32.4	27.7	-144,779	0.0	-166,935	0.0	-194,870	0.0	-194,655	0.0	-166,213	0.0
23	28.8	24.3	-195,064	0.0	-204,414	0.0	-220,749	0.0	-220,539	0.0	-203,710	0.0
24	25.9	21.7	-214,539	0.0	-237,557	0.0	-248,657	0.0	-248,452	0.0	-236,870	0.0

February			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	31.5	28.3	-239,617	0.0	-208,479	0.0	-229,345	0.0	-229,357	0.0	-222,088	0.0
2	29.8	26.8	-256,475	0.0	-239,303	0.0	-242,616	0.0	-242,618	0.0	-240,156	0.0
3	28.3	25.5	-266,128	0.0	-252,315	0.0	-254,394	0.0	-254,387	0.0	-251,930	0.0
4	27.1	24.4	-285,809	0.0	-263,031	0.0	-265,107	0.0	-265,092	0.0	-262,639	0.0
5	26.2	23.6	-291,358	0.0	-270,261	0.0	-282,318	0.0	-281,693	0.0	-279,244	0.0
6	25.6	23.5	-291,851	0.0	-275,786	0.0	-291,255	0.0	-291,190	0.0	-288,746	0.0
7	25.5	23.4	-287,004	0.0	-286,326	0.0	-289,949	0.0	-289,878	0.0	-287,439	0.0
8	26.2	24.4	-276,275	0.0	-261,758	0.0	-280,977	0.0	-280,903	0.0	-262,586	0.0
9	28.3	26.1	-225,010	0.0	-236,253	0.0	-263,020	0.0	-266,875	0.0	-242,315	0.0
10	31.5	28.7	-184,319	0.0	-207,773	0.0	-249,625	0.0	-249,332	0.0	-219,494	0.0
11	35.2	31.3	-125,320	0.0	-171,398	0.0	-207,242	0.0	-206,956	0.0	-171,902	0.0
12	39.0	33.9	-97,214	0.0	-138,176	0.0	-172,314	0.0	-172,035	0.0	-137,888	0.0
13	42.2	35.9	-79,405	0.0	-109,562	0.0	-139,707	0.0	-139,435	0.0	-109,268	0.0
14	44.3	36.9	-71,881	0.0	-88,147	0.0	-117,828	0.0	-117,562	0.0	-87,841	0.0
15	45.0	36.8	-70,728	0.0	-85,707	0.0	-112,437	0.0	-112,177	0.0	-85,390	0.0
16	44.8	36.3	-73,754	0.0	-87,778	0.0	-115,344	0.0	-115,091	0.0	-87,458	0.0
17	44.3	35.8	-78,322	0.0	-91,350	0.0	-121,379	0.0	-121,133	0.0	-91,024	0.0
18	43.4	35.6	-84,776	0.0	-97,416	0.0	-130,062	0.0	-129,822	0.0	-97,088	0.0
19	42.2	36.1	-91,354	0.0	-102,149	0.0	-137,315	0.0	-137,081	0.0	-101,815	0.0
20	40.7	35.9	-109,671	0.0	-109,129	0.0	-147,234	0.0	-147,005	0.0	-108,792	0.0
21	39.0	34.5	-134,824	0.0	-130,463	0.0	-159,622	0.0	-159,398	0.0	-130,121	0.0
22	37.1	33.2	-146,579	0.0	-143,731	0.0	-172,076	0.0	-171,858	0.0	-143,390	0.0
23	35.2	31.5	-193,160	0.0	-171,309	0.0	-188,034	0.0	-187,822	0.0	-170,967	0.0
24	33.3	29.9	-211,378	0.0	-197,091	0.0	-208,520	0.0	-208,312	0.0	-196,748	0.0

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

March			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	40.0	36.8	-198,213	0.0	-121,895	0.0	-136,216	0.0	-163,938	0.0	-156,975	0.0
2	37.3	34.5	-216,561	0.0	-151,064	0.0	-173,957	0.0	-183,034	0.0	-180,870	0.0
3	34.9	32.2	-228,124	0.0	-178,717	0.0	-195,840	0.0	-196,004	0.0	-193,837	0.0
4	32.9	30.3	-238,167	0.0	-206,883	0.0	-207,653	0.0	-207,813	0.0	-205,643	0.0
5	31.4	28.8	-252,625	0.0	-219,697	0.0	-237,286	0.0	-237,474	0.0	-235,333	0.0
6	30.4	28.0	-253,328	0.0	-230,611	0.0	-247,724	0.0	-247,881	0.0	-245,710	0.0
7	30.1	27.6	-241,697	0.0	-247,053	0.0	-249,539	0.0	-249,692	0.0	-247,460	0.0
8	30.7	28.0	-201,033	0.0	-224,970	0.0	-243,589	0.0	-243,739	0.0	-225,373	0.0
9	32.5	28.9	-160,443	0.0	-205,051	0.0	-229,428	0.0	-229,575	0.0	-205,450	0.0
10	35.4	30.6	-108,573	0.0	-176,979	0.0	-206,335	0.0	-206,479	0.0	-177,374	0.0
11	38.9	32.6	-73,617	0.0	-140,834	0.0	-175,546	0.0	-175,688	0.0	-141,224	0.0
12	42.9	35.4	-56,011	0.0	-110,481	0.0	-142,873	0.0	-143,011	0.0	-110,866	0.0
13	46.8	38.5	-46,283	0.0	-82,097	0.0	-107,738	0.0	-107,874	0.0	-82,479	0.0
14	50.4	41.3	-40,110	0.0	-63,627	0.0	-85,747	0.0	-85,880	0.0	-64,002	0.0
15	53.2	43.6	-38,584	0.0	-55,649	0.0	-70,217	0.0	-70,323	0.0	-55,747	0.0
16	55.0	45.1	-42,598	0.0	-51,504	0.0	-63,014	0.0	-63,123	0.0	-51,637	0.0
17	55.6	45.4	-49,275	0.0	-49,833	0.0	-61,064	0.0	-61,175	0.0	-49,996	0.0
18	55.3	45.9	-58,252	0.0	-49,963	0.0	-63,727	0.0	-63,839	0.0	-50,150	0.0
19	54.4	46.1	-68,062	0.0	-51,375	0.0	-69,782	0.0	-69,895	0.0	-51,581	0.0
20	52.8	46.3	-77,944	0.0	-54,891	0.0	-75,574	0.0	-75,688	0.0	-55,110	0.0
21	50.8	45.5	-86,596	0.0	-60,759	0.0	-86,397	0.0	-86,508	0.0	-61,056	0.0
22	48.4	43.7	-94,959	0.0	-68,908	0.0	-101,646	0.0	-101,755	0.0	-69,202	0.0
23	45.7	41.6	-101,153	0.0	-89,498	0.0	-125,935	0.0	-126,042	0.0	-89,788	0.0
24	42.9	39.2	-123,275	0.0	-114,310	0.0	-144,742	0.0	-144,847	0.0	-114,597	0.0

April			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	OAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	56.3	50.9	-67,105	0.0	-49,338	0.0	-49,851	0.0	-49,869	0.0	-49,833	0.0
2	54.2	48.9	-72,801	0.0	-59,032	0.0	-59,393	0.0	-59,379	0.0	-59,336	0.0
3	52.3	47.7	-82,330	0.0	-67,617	0.0	-66,846	0.0	-66,589	0.0	-66,490	0.0
4	50.7	46.4	-97,358	0.0	-72,288	0.0	-71,529	0.0	-71,277	0.0	-71,181	0.0
5	49.5	45.4	-99,564	0.0	-75,576	0.0	-74,840	0.0	-86,485	0.0	-85,078	0.0
6	48.8	44.7	-99,902	0.0	-77,790	0.0	-80,885	0.0	-93,941	0.0	-102,027	0.0
7	48.5	44.7	-77,780	0.0	-79,069	0.0	-90,190	0.0	-120,809	0.0	-105,927	0.0
8	49.2	44.5	-54,526	0.0	-83,467	0.0	-85,561	0.0	-115,695	0.0	-91,321	0.0
9	51.2	44.6	-42,660	0.0	-73,570	0.0	-73,749	0.0	-95,431	0.0	-73,825	0.0
10	54.2	46.1	-34,903	0.0	-60,553	0.0	-59,764	0.0	-71,863	0.0	-59,626	0.0
11	57.8	48.8	0	0.0	-49,041	0.0	-49,345	0.0	-53,182	0.0	-49,121	0.0
12	61.8	51.6	0	0.0	-5,862	0.0	-10,239	0.0	-11,422	0.0	-11,585	0.0
13	65.4	54.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
14	68.4	56.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
15	70.4	58.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
16	71.0	58.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
17	70.8	58.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
18	70.1	58.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
19	68.9	58.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
20	67.3	58.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
21	65.4	57.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
22	63.3	56.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
23	61.0	54.8	-28,521	0.0	0	0.0	0	0.0	0	0.0	0	0.0
24	58.6	53.0	-50,233	0.0	-23,322	0.0	-25,962	0.0	-26,715	0.0	-26,998	0.0



BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

May			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----			
Hour	OADB	OAWB	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton
1	63.3	59.6		0	21.7		0			1.7		0		1.8		0		1.8
2	61.3	57.9		0	6.6		0			1.6		0		1.6		0		1.6
3	59.7	56.5		0	1.5		0			1.4		0		1.4		0		1.4
4	58.4	55.5		0	1.5		0			1.3		0		1.3		0		1.3
5	57.6	54.8		0	1.4		0			1.3		0		0.0		0		0.0
6	57.4	54.7		0	1.4		0			0.0		0		0.0		0		0.0
7	57.9	55.2		0	0.0		0			0.0		0		0.0		0		0.0
8	59.4	55.6		0	0.0		0			0.0		0		0.0		0		0.0
9	61.7	56.5		0	0.7		0			0.0		0		0.0		0		0.0
10	64.6	57.7		0	1.9		0			0.0		0		0.0		0		0.0
11	67.8	59.7		0	7.3		0			1.6		0		0.0		0		0.0
12	71.0	62.0		0	17.9		0			2.7		0		2.2		0		2.2
13	73.9	63.9		0	27.1		0			8.3		0		3.9		0		3.9
14	76.3	65.3		0	30.7		0			13.6		0		7.4		0		7.4
15	77.7	66.4		0	32.1		0			16.2		0		8.5		0		8.5
16	78.2	66.4		0	30.1		0			20.2		0		13.0		0		13.0
17	78.0	66.3		0	29.9		0			22.5		0		17.9		0		17.9
18	77.2	66.2		0	27.3		0			22.1		0		18.3		0		18.3
19	76.0	66.5		0	23.4		0			20.5		0		17.7		0		17.7
20	74.3	66.4		0	18.6		0			18.2		0		15.2		0		15.2
21	72.3	66.5		0	13.1		0			14.2		0		11.0		0		11.0
22	70.1	64.9		0	5.9		0			7.3		0		5.8		0		5.8
23	67.8	63.2		0	2.3		0			3.1		0		2.7		0		2.7
24	65.5	61.4		0	1.7		0			1.9		0		1.9		0		1.9

June			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----			
Hour	OADB	OAWB	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton	Htg	Btuh	Clg	Ton
1	66.2	65.3		0	2.2		0			2.2		0		2.1		0		2.1
2	65.3	63.9		0	2.3		0			2.1		0		2.1		0		2.1
3	64.5	62.4		0	2.2		0			2.0		0		1.9		0		1.9
4	64.0	61.3		0	2.0		0			1.9		0		1.8		0		1.8
5	63.8	60.8		0	1.0		0			1.8		0		1.7		0		1.7
6	64.2	61.2		0	0.0		0			1.9		0		0.0		0		0.0
7	65.1	61.7		0	0.0		0			0.0		0		0.0		0		0.0
8	66.8	62.3		0	0.0		0			0.5		0		0.0		0		0.0
9	69.3	63.3		0	2.9		0			1.0		0		0.0		0		0.0
10	72.1	65.2		0	17.3		0			3.1		0		1.6		0		1.6
11	75.4	67.5		0	27.5		0			13.6		0		6.8		0		12.0
12	78.4	69.8		0	36.2		0			24.1		0		13.8		0		22.5
13	80.7	71.6		0	40.6		0			31.3		0		22.9		0		30.9
14	82.2	72.7		0	42.7		0			33.6		0		29.5		0		33.6
15	82.8	72.8		0	43.7		0			34.3		0		30.9		0		34.3
16	82.2	73.1		0	42.9		0			33.6		0		29.9		0		33.6
17	80.9	72.7		0	42.8		0			34.1		0		30.6		0		34.0
18	78.8	71.6		0	39.5		0			31.7		0		28.5		0		31.7
19	76.3	71.3		0	35.9		0			27.6		0		24.4		0		27.6
20	73.8	72.0		0	29.9		0			23.1		0		19.7		0		23.1
21	71.8	71.8		0	23.9		0			17.8		0		14.2		0		17.8
22	69.9	71.0		0	14.9		0			9.7		0		7.7		0		9.7
23	68.3	68.9		0	9.5		0			4.5		0		4.0		0		4.5
24	67.2	66.8		0	5.0		0			2.3		0		2.3		0		2.3

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

July			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	70.9	71.0	0	5.4		0	4.8		0	4.0		0	3.9		0	4.0	
2	69.8	68.8	0	4.6		0	3.5		0	2.9		0	2.9		0	2.9	
3	68.9	67.0	0	3.3		0	2.7		0	2.4		0	2.4		0	2.4	
4	68.2	65.9	0	2.8		0	2.4		0	2.4		0	2.4		0	2.4	
5	68.0	65.2	0	2.7		0	2.4		0	2.4		0	2.4		0	2.4	
6	68.4	64.9	0	2.1		0	2.4		0	2.4		0	2.4		0	2.4	
7	69.6	65.3	0	0.0		0	2.6		0	2.1		0	1.9		0	1.9	
8	71.6	65.6	0	10.8		0	3.6		0	2.1		0	2.1		0	2.1	
9	74.5	65.7	0	21.1		0	7.7		0	4.6		0	4.6		0	6.0	
10	77.9	66.5	0	26.8		0	20.0		0	11.6		0	11.6		0	20.1	
11	81.7	67.9	0	34.8		0	26.5		0	18.8		0	18.7		0	26.2	
12	85.3	69.9	0	42.7		0	33.9		0	31.0		0	31.0		0	33.9	
13	88.0	71.3	0	47.2		0	40.4		0	37.0		0	37.0		0	40.3	
14	89.8	72.5	0	48.1		0	41.0		0	37.6		0	37.6		0	40.9	
15	90.5	73.9	0	49.0		0	42.1		0	38.8		0	38.8		0	42.0	
16	89.8	75.3	0	48.3		0	41.8		0	38.5		0	38.5		0	41.8	
17	88.2	75.5	0	47.7		0	41.4		0	38.0		0	38.0		0	41.4	
18	85.8	76.2	0	45.9		0	37.9		0	34.7		0	34.7		0	37.9	
19	82.8	76.7	0	41.3		0	34.3		0	31.3		0	31.3		0	34.2	
20	79.9	78.6	0	38.3		0	30.0		0	26.9		0	26.9		0	30.0	
21	77.4	78.8	0	33.3		0	24.9		0	21.6		0	21.6		0	24.8	
22	75.2	78.0	0	23.9		0	17.0		0	14.9		0	14.9		0	16.9	
23	73.4	75.4	0	16.8		0	11.1		0	9.4		0	9.4		0	11.1	
24	72.0	73.0	0	11.7		0	6.8		0	5.9		0	5.9		0	6.7	

August			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	68.0	65.3	0	3.7		0	2.5		0	2.1		0	2.1		0	2.1	
2	67.0	63.5	0	2.7		0	2.0		0	2.0		0	2.0		0	2.0	
3	66.2	62.2	0	2.2		0	1.9		0	1.8		0	1.8		0	1.8	
4	65.6	61.1	0	2.0		0	1.8		0	1.7		0	1.7		0	1.7	
5	65.4	60.7	0	2.0		0	1.7		0	1.7		0	1.7		0	1.7	
6	65.8	60.7	0	2.1		0	1.8		0	0.0		0	0.0		0	0.0	
7	66.8	61.2	0	1.6		0	1.3		0	0.0		0	0.0		0	0.0	
8	68.6	61.6	0	2.1		0	0.7		0	0.0		0	0.0		0	0.0	
9	71.2	62.5	0	6.3		0	1.1		0	0.6		0	0.6		0	0.6	
10	74.3	63.6	0	20.6		0	5.0		0	4.1		0	4.1		0	4.1	
11	77.7	65.1	0	25.9		0	14.5		0	7.8		0	7.8		0	14.2	
12	80.9	66.8	0	33.4		0	23.8		0	15.5		0	15.5		0	22.9	
13	83.4	68.2	0	38.1		0	29.7		0	22.5		0	21.8		0	29.4	
14	85.0	69.7	0	40.4		0	31.2		0	27.8		0	27.7		0	31.2	
15	85.6	70.7	0	41.6		0	32.2		0	28.7		0	28.7		0	32.2	
16	85.0	70.5	0	39.4		0	31.4		0	28.0		0	27.9		0	31.5	
17	83.6	70.4	0	38.3		0	31.4		0	28.2		0	28.2		0	31.4	
18	81.3	70.7	0	35.9		0	29.0		0	26.0		0	26.0		0	29.0	
19	78.7	70.7	0	32.2		0	24.8		0	21.9		0	21.9		0	24.8	
20	76.1	71.9	0	28.3		0	21.5		0	18.4		0	18.4		0	21.5	
21	73.9	72.4	0	22.9		0	17.2		0	13.9		0	13.9		0	17.2	
22	71.8	71.1	0	15.2		0	9.8		0	7.8		0	7.8		0	9.8	
23	70.2	69.3	0	10.0		0	5.4		0	4.6		0	4.6		0	5.4	
24	69.0	67.2	0	6.2		0	2.7		0	2.7		0	2.7		0	2.7	

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

September			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	61.8	61.5	0	2.0		0	1.8		0	1.7		0	1.7		0	1.7	
2	60.8	59.7	0	1.9		0	1.7		0	1.6		0	1.6		0	1.6	
3	60.0	58.4	0	1.7		0	1.5		0	1.4		0	1.4		0	1.4	
4	59.4	57.1	0	1.6		0	1.4		0	0.5		0	0.0		0	0.0	
5	59.2	56.3	0	1.5		0	1.4		0	0.0		0	0.0		0	0.0	
6	59.6	56.1	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
7	60.6	56.7	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
8	62.4	57.9	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
9	65.1	58.6	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
10	68.1	59.6	0	0.5		0	0.0		0	0.0		0	0.0		0	0.0	
11	71.6	61.1	0	6.8		0	1.3		0	0.8		0	0.8		0	0.8	
12	74.8	62.7	0	18.1		0	4.9		0	9.2		0	9.2		0	10.6	
13	77.2	64.6	0	25.8		0	12.6		0	10.6		0	10.6		0	15.7	
14	78.9	66.0	0	30.5		0	17.2		0	10.9		0	10.9		0	18.4	
15	79.5	67.1	0	31.6		0	20.0		0	15.0		0	15.0		0	22.3	
16	78.9	67.5	0	30.5		0	22.7		0	16.5		0	16.5		0	23.2	
17	77.4	67.9	0	30.5		0	23.2		0	16.2		0	15.1		0	20.4	
18	75.2	68.0	0	26.9		0	20.4		0	14.5		0	14.4		0	18.2	
19	72.6	69.3	0	23.6		0	18.3		0	11.1		0	11.1		0	14.4	
20	69.9	70.0	0	19.6		0	14.4		0	7.4		0	7.4		0	9.9	
21	67.7	69.0	0	14.5		0	9.9		0	2.7		0	2.7		0	3.0	
22	65.7	67.3	0	6.6		0	3.1		0	1.9		0	1.9		0	1.9	
23	64.0	65.4	0	2.9		0	1.8		0	1.8		0	1.8		0	1.8	
24	62.8	63.6	0	2.0		0	1.8										

October			----- Design -----			----- Weekday -----			----- Saturday-----			----- Sunday -----			----- Monday -----		
Hour	OADB	OAWB	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton	Htg	Btuh	Clg Ton
1	50.7	45.9	-71,455	0.0		-68,606	0.0		-67,865	0.0		-77,591	0.0		-76,600	0.0	
2	48.4	44.0	-75,012	0.0		-75,689	0.0		-74,981	0.0		-92,291	0.0		-88,783	0.0	
3	46.3	42.0	-77,888	0.0		-82,048	0.0		-81,372	0.0		-114,691	0.0		-112,406	0.0	
4	44.6	40.8	-88,968	0.0		-86,985	0.0		-89,163	0.0		-126,553	0.0		-124,269	0.0	
5	43.4	39.7	-99,152	0.0		-101,318	0.0		-106,562	0.0		-147,432	0.0		-145,149	0.0	
6	42.6	39.1	-97,029	0.0		-110,011	0.0		-120,407	0.0		-151,871	0.0		-149,588	0.0	
7	42.3	38.9	-91,774	0.0		-116,813	0.0		-131,616	0.0		-157,111	0.0		-140,674	0.0	
8	43.4	39.8	-86,500	0.0		-113,714	0.0		-146,757	0.0		-148,982	0.0		-124,848	0.0	
9	46.3	41.5	-62,894	0.0		-96,130	0.0		-129,493	0.0		-129,423	0.0		-99,415	0.0	
10	50.7	43.0	-42,155	0.0		-70,834	0.0		-97,781	0.0		-97,714	0.0		-70,259	0.0	
11	56.0	45.7	-31,809	0.0		-50,487	0.0		-66,532	0.0		-66,465	0.0		-50,176	0.0	
12	61.2	49.1	0	0.0		-34,316	0.0		-38,482	0.0		-38,583	0.0		-34,733	0.0	
13	65.6	52.3	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
14	68.5	54.1	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
15	69.6	54.8	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
16	69.3	54.0	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
17	68.5	54.2	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
18	67.3	54.6	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
19	65.6	55.9	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
20	63.5	55.7	-6,499	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
21	61.2	54.5	-41,345	0.0		0	0.0		0	0.0		0	0.0		0	0.0	
22	58.6	52.4	-53,535	0.0		-32,840	0.0		-33,003	0.0		-33,054	0.0		-33,089	0.0	
23	56.0	50.0	-63,462	0.0		-45,997	0.0		-45,881	0.0		-45,855	0.0		-45,820	0.0	
24	53.3	48.0	-69,523	0.0		-58,185	0.0		-58,075	0.0		-58,050	0.0		-58,017	0.0	

BUILDING COOL-HEAT DEMAND - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

November			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	QAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	43.8	40.3	-88,153	0.0	-91,814	0.0	-109,619	0.0	-142,273	0.0	-134,873	0.0
2	42.0	38.9	-90,978	0.0	-126,268	0.0	-128,310	0.0	-153,502	0.0	-150,912	0.0
3	40.5	37.5	-102,953	0.0	-136,631	0.0	-144,359	0.0	-163,141	0.0	-160,560	0.0
4	39.4	36.3	-121,332	0.0	-158,964	0.0	-171,293	0.0	-170,821	0.0	-168,249	0.0
5	38.7	35.8	-140,850	0.0	-176,045	0.0	-177,155	0.0	-176,694	0.0	-174,130	0.0
6	38.4	35.6	-156,468	0.0	-177,870	0.0	-179,020	0.0	-178,570	0.0	-176,015	0.0
7	39.1	36.3	-164,201	0.0	-174,888	0.0	-179,089	0.0	-180,536	0.0	-178,928	0.0
8	41.0	38.2	-136,633	0.0	-150,012	0.0	-178,208	0.0	-177,864	0.0	-160,543	0.0
9	43.8	40.6	-108,807	0.0	-136,270	0.0	-160,108	0.0	-159,769	0.0	-135,561	0.0
10	47.3	42.8	-72,837	0.0	-104,854	0.0	-134,140	0.0	-133,806	0.0	-103,962	0.0
11	51.1	45.4	-55,542	0.0	-73,703	0.0	-102,766	0.0	-102,438	0.0	-72,817	0.0
12	54.6	47.5	-48,003	0.0	-55,652	0.0	-77,007	0.0	-76,266	0.0	-53,203	0.0
13	57.4	49.2	-42,426	0.0	-48,797	0.0	-59,813	0.0	-59,118	0.0	-46,512	0.0
14	59.3	50.0	-18,194	0.0	-43,612	0.0	-47,342	0.0	-46,684	0.0	-41,455	0.0
15	59.9	50.3	-4,457	0.0	-41,034	0.0	-43,692	0.0	-43,165	0.0	-39,524	0.0
16	59.7	50.1	-7,809	0.0	-40,928	0.0	-44,163	0.0	-43,654	0.0	-39,460	0.0
17	59.0	50.0	-23,189	0.0	-42,058	0.0	-48,141	0.0	-47,648	0.0	-40,632	0.0
18	57.9	50.8	-39,198	0.0	-43,726	0.0	-54,511	0.0	-54,034	0.0	-42,333	0.0
19	56.4	51.0	-47,185	0.0	-46,221	0.0	-60,772	0.0	-60,307	0.0	-44,848	0.0
20	54.6	49.7	-56,677	0.0	-50,591	0.0	-69,054	0.0	-68,598	0.0	-49,237	0.0
21	52.5	48.2	-65,226	0.0	-57,041	0.0	-80,923	0.0	-80,547	0.0	-55,837	0.0
22	50.3	46.2	-71,987	0.0	-64,447	0.0	-91,709	0.0	-91,345	0.0	-63,280	0.0
23	48.1	44.0	-77,452	0.0	-71,839	0.0	-102,364	0.0	-102,010	0.0	-70,705	0.0
24	45.9	42.4	-81,395	0.0	-81,154	0.0	-116,902	0.0	-116,558	0.0	-80,050	0.0

December			----- Design -----		----- Weekday -----		----- Saturday-----		----- Sunday -----		----- Monday -----	
Hour	OADB	QAWB	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton	Htg Btuh	Clg Ton
1	32.1	29.4	-180,714	0.0	-221,635	0.0	-227,380	0.0	-225,710	0.0	-217,682	0.0
2	30.2	27.8	-211,014	0.0	-243,010	0.0	-243,944	0.0	-242,312	0.0	-239,109	0.0
3	28.5	25.9	-248,230	0.0	-253,400	0.0	-254,327	0.0	-252,733	0.0	-249,553	0.0
4	27.1	24.9	-268,396	0.0	-265,594	0.0	-276,288	0.0	-273,792	0.0	-270,633	0.0
5	26.1	24.0	-281,209	0.0	-278,549	0.0	-289,901	0.0	-288,326	0.0	-285,189	0.0
6	25.4	23.6	-280,119	0.0	-297,337	0.0	-299,388	0.0	-297,851	0.0	-294,736	0.0
7	25.2	23.3	-273,921	0.0	-295,098	0.0	-297,091	0.0	-295,591	0.0	-292,497	0.0
8	25.8	24.0	-253,572	0.0	-277,854	0.0	-313,033	0.0	-311,480	0.0	-294,250	0.0
9	27.5	25.7	-226,029	0.0	-252,382	0.0	-290,702	0.0	-289,279	0.0	-262,967	0.0
10	30.2	27.9	-188,518	0.0	-234,092	0.0	-268,050	0.0	-266,661	0.0	-243,024	0.0
11	33.4	30.3	-148,829	0.0	-199,196	0.0	-232,334	0.0	-230,978	0.0	-197,740	0.0
12	36.9	32.7	-110,243	0.0	-167,684	0.0	-199,667	0.0	-198,344	0.0	-163,481	0.0
13	40.2	35.1	-88,097	0.0	-139,086	0.0	-166,909	0.0	-165,621	0.0	-134,995	0.0
14	42.8	36.9	-76,176	0.0	-111,366	0.0	-141,569	0.0	-140,310	0.0	-107,367	0.0
15	44.6	38.1	-72,990	0.0	-96,849	0.0	-127,966	0.0	-126,733	0.0	-92,935	0.0
16	45.2	38.5	-76,624	0.0	-92,418	0.0	-123,103	0.0	-121,904	0.0	-88,607	0.0
17	44.9	38.7	-82,196	0.0	-94,299	0.0	-126,939	0.0	-125,769	0.0	-90,580	0.0
18	44.3	39.6	-92,275	0.0	-97,417	0.0	-130,090	0.0	-128,951	0.0	-93,798	0.0
19	43.3	39.6	-105,355	0.0	-106,925	0.0	-135,541	0.0	-134,427	0.0	-103,386	0.0
20	41.9	38.6	-131,345	0.0	-116,751	0.0	-144,295	0.0	-143,208	0.0	-113,386	0.0
21	40.2	37.1	-156,931	0.0	-126,665	0.0	-153,453	0.0	-152,392	0.0	-123,292	0.0
22	38.3	35.3	-170,343	0.0	-140,262	0.0	-166,768	0.0	-165,732	0.0	-136,971	0.0
23	36.2	33.4	-202,782	0.0	-176,449	0.0	-190,959	0.0	-189,949	0.0	-173,249	0.0
24	34.1	31.4	-231,198	0.0	-199,807	0.0	-209,965	0.0	-208,979	0.0	-196,674	0.0

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BLDG 4109 BASERUN FT LEONARD WOOD

----- BUILDING TEMPERATURE PROFILES -----								
Temperature Range (F)	----- Room Number -----							
	1	2	3	4	5	6	7	
Max. Temp.	77.6	78.2	80.3	78.7	78.7	79.2	83.8	
Mo./Hr.	4 21	4 20	4 19	4 20	4 20	4 19	4 20	
Day Type	1	1	1	1	1	1	1	
..... Number of Hours .....								
Above 100	0	0	0	0	0	0	0	
95 - 100	0	0	0	0	0	0	0	
90 - 95	0	0	0	0	0	0	0	
85 - 90	0	0	0	0	0	0	0	
80 - 85	0	0	0	0	0	0	0 1,012	
75 - 80	144	246	350	670	1,827	1,428	4,690	
70 - 75	5,078	5,623	5,116	6,028	6,917	6,848	2,825	
65 - 70	3,538	2,891	3,294	2,062	16	484	233	
60 - 65	0	0	0	0	0	0	0	
55 - 60	0	0	0	0	0	0	0	
50 - 55	0	0	0	0	0	0	0	
Below 50	0	0	0	0	0	0	0	
Min. Temp.	69.9	69.9	69.9	69.9	70.0	70.0	70.0	
Mo./Hr.	1 1	2 10	2 4	1 13	1 1	1 1	1 1	
Day Type	3	3	2	1	1	1	1	

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 4109 BASERUN FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	32,796	71	1,685	4
Feb	29,628	71	1,543	4
March	33,146	71	1,222	3
April	30,858	71	305	2
May	37,507	106	0	0
June	41,763	121	0	0
July	48,196	131	0	0
Aug	43,030	120	0	0
Sept	35,935	106	0	0
Oct	32,332	71	485	2
Nov	31,682	71	879	2
Dec	32,622	71	1,807	4
Total	429,495	131	7,926	4

Building Energy Consumption = 106,266 (Btu/Sq Ft/Year)  
Source Energy Consumption = 246,194 (Btu/Sq Ft/Year)

Floor Area = 21,253 (Sq Ft)

## ----- EQUIPMENT ENERGY CONSUMPTION

Ref	Equip	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	8341	7537	8544	8040	8442	8242	8240	8544	8040	8442	8040	8240	98,691
	PK	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
1	MISC LD													
	ELEC	15398	13910	15545	14877	15471	15024	15324	15545	14877	15471	14877	15324	181,645
	PK	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1121L	AIR-CLD RECIP 35-60 TONS												
	ELEC	0	0	0	0	4356	8866	14047	8962	4111	0	0	0	40,341
	PK	0.0	0.0	0.0	0.0	31.4	45.4	55.0	44.2	31.1	0.0	0.0	0.0	55.0
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	453	894	1342	898	433	0	0	0	4,021
	PK	0.0	0.0	0.0	0.0	3.1	3.9	3.9	3.9	3.0	0.0	0.0	0.0	3.9
1	EQ5001	CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	1260	1423	1665	1515	1193	0	0	0	7,056
	PK	0.0	0.0	0.0	0.0	2.2	2.2	2.2	2.2	2.2	0.0	0.0	0.0	2.2
1	EQ5313	CONTROLS												
	ELEC	0	0	0	0	169	191	223	203	160	0	0	0	946
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1121L	AIR-CLD RECIP 35-60 TONS												





EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1

BLDG 4109 BASERUN FT LEONARD WOOD

	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5200	CONDENSER FANS												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.												0
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5313	CONTROLS												19
	ELEC	0	0	0	0	5	0	9	4	0	0	0	0	19
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003	FC CENTRIF. FAN C.V.												4,906
	ELEC	417	376	417	403	417	403	417	417	403	417	403	417	4,906
	PK	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
2	EQ4003	FC CENTRIF. FAN C.V.												9,802
	ELEC	833	752	833	806	833	806	833	833	806	833	806	833	9,802
	PK	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
3	EQ4003	FC CENTRIF. FAN C.V.												6,535
	ELEC	555	501	555	537	555	537	555	555	537	555	537	555	6,535
	PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
4	EQ4002	BI CENTRIF. FAN C.V.												65,350
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	65,350
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1	EQ2001	GAS FIRE TUBE HOT WATER												7,926
	GAS	1685	1543	1222	305	0	0	0	0	0	485	879	1807	7,926
	PK	4.5	3.6	3.2	1.5	0.0	0.0	0.0	0.0	0.0	2.0	2.3	3.9	4.5
1	EQ5020	HEAT WATER CIRC. PUMP C.V.												2,491
	ELEC	417	376	417	202	0	0	0	0	0	260	403	417	2,491
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1	EQ5240	BOILER FORCED DRAFT FAN												5,467
	ELEC	914	826	914	442	0	0	0	0	0	571	885	914	5,467
	PK	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2
1	EQ5307	BOILER CONTROLS												2,225
	ELEC	372	336	372	180	0	0	0	0	0	233	360	372	2,225
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 4109 NIGHT SETBACK FT LEONARD WOOD

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	33,351	72	1,528	9
Feb	30,129	72	1,423	7
March	33,701	72	1,165	6
April	31,395	71	305	3
May	36,807	107	0	0
June	40,855	122	0	0
July	47,151	132	0	0
Aug	42,276	121	0	0
Sept	35,323	107	0	0
Oct	32,679	71	483	3
Nov	32,219	72	846	4
Dec	33,177	72	1,667	7
Total	429,063	132	7,417	9

Building Energy Consumption = 103,799 (Btu/Sq Ft/Year)  
Source Energy Consumption = 243,462 (Btu/Sq Ft/Year)

Floor Area = 21,253 (Sq Ft)

## ----- EQUIPMENT ENERGY CONSUMPTION

[illegible]

	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5200	CONDENSER FANS											
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5313	CONTROLS											
	ELEC	0	0	0	0	0	9	8	0	0	0	0	17
	PK	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.3
1	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	417	376	417	403	417	403	417	417	403	417	403	4,906
	PK	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
2	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	833	752	833	806	833	806	833	833	806	833	806	9,802
	PK	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
3	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	555	501	555	537	555	537	555	555	537	555	537	6,535
	PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
4	EQ4002	BI CENTRIF. FAN C.V.											
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	65,350
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1	EQ2001	GAS FIRE TUBE HOT WATER											
	GAS	1528	1423	1165	305	0	0	0	0	0	483	846	1667
	PK	9.5	6.9	6.1	2.7	0.0	0.0	0.0	0.0	0.0	3.3	4.0	7.1
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											
	ELEC	417	376	417	202	0	0	0	0	260	403	417	2,491
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1	EQ5240	BOILER FORCED DRAFT FAN											
	ELEC	914	826	914	442	0	0	0	0	0	571	885	914
	PK	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2
1	EQ5307	BOILER CONTROLS											
	ELEC	372	336	372	180	0	0	0	0	233	360	372	2,225
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5
1	EQ5013	WATER CIRC. PUMP C.V.											
	ELEC	278	251	278	269	0	0	0	0	173	269	278	1,794
	PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4
1	EQ5013	WATER CIRC. PUMP C.V.											

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 4109 NIGHT SETBACK FT LEONARD WOOD

ELEC	278	251	278	269	0	0	0	0	0	173	269	278	1,794
PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 4109 DDC CONTROL FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	33,351	72	1,313	8
Feb	30,129	72	1,254	5
March	33,701	72	1,037	4
April	30,817	70	217	1
May	34,957	104	0	0
June	38,391	118	0	0
July	44,221	128	0	0
Aug	39,849	117	0	0
Sept	33,563	103	0	0
Oct	32,397	71	372	1
Nov	31,860	71	644	4
Dec	33,177	72	1,448	5
Total	416,413	128	6,284	8

Building Energy Consumption = 96,441 (Btu/Sq Ft/Year)  
Source Energy Consumption = 231,760 (Btu/Sq Ft/Year)

Floor Area = 21,253 (Sq Ft)

## EQUIPMENT ENERGY CONSUMPTION

[illegible]

UNIT	WATER	CONDENSATE	CHILLED WATER	STEAM	CONDENSATE	CHILLED WATER	CONDENSATE	CHILLED WATER	CONDENSATE	CHILLED WATER	CONDENSATE	CHILLED WATER	CONDENSATE
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5200	CONDENSER FANS												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5001	CHILLED WATER PUMP C.V.												
ELEC	0	0	0	0	0	0	0	0	0	0	0	0	0
PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 EQ5313	CONTROLS												
ELEC	0	0	0	0	4	0	5	0	0	0	0	0	8
PK	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.3
1 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	417	376	417	403	417	403	417	417	403	417	403	417	4,906
PK	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
2 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	833	752	833	806	833	806	833	833	806	833	806	833	9,802
PK	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
3 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	555	501	555	537	555	537	555	555	537	555	537	555	6,535
PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550	65,350
PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1 EQ2001	GAS FIRE TUBE HOT WATER												
GAS	1313	1254	1037	217	0	0	0	0	0	372	644	1448	6,284
PK	7.7	5.1	4.4	1.3	0.0	0.0	0.0	0.0	0.0	1.5	3.7	5.3	7.7
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	417	376	417	142	0	0	0	0	0	208	327	417	2,304
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	914	826	914	312	0	0	0	0	0	457	718	914	5,055
PK	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2
1 EQ5307	BOILER CONTROLS												
ELEC	372	336	372	127	0	0	0	0</					



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 4109 DDC CONTROL FT LEONARD WOOD

ELEC	278	251	278	101	0	0	0	0	0	139	245	278	1,567
PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 4109 OA NIGHTTIME FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	33,065	72	665	3
Feb	29,810	72	645	3
March	32,974	72	455	3
April	30,409	71	107	1
May	39,152	105	0	0
June	42,530	120	0	0
July	47,302	130	0	0
Aug	43,743	119	0	0
Sept	37,640	105	0	0
Oct	32,130	71	141	2
Nov	31,456	72	296	2
Dec	32,884	72	824	4
Total	433,096	130	3,133	4

Building Energy Consumption = 84,290 (Btu/Sq Ft/Year)  
Source Energy Consumption = 224,188 (Btu/Sq Ft/Year)

Floor Area = 21,253 (Sq Ft)

----- EQUIPMENT ENERGY CONSUMPTION

Ref	Equip	Monthly Consumption												
Num	Code	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
0	LIGHTS													
	ELEC	8341	7537	8544	8040	8442	8242	8240	8544	8040	8442	8040	8240	98,691
	PK	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
1	MISC LD													
	ELEC	15398	13910	15545	14877	15471	15024	15324	15545	14877	15471	14877	15324	181,645
	PK	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1121L	AIR-CLD RECIP 35-60 TONS												
	ELEC	0	0	0	0	4995	8797	12615	8822	4914	0	0	0	40,143
	PK	0.0	0.0	0.0	0.0	30.3	44.0	53.5	42.9	29.7	0.0	0.0	0.0	53.5
1	EQ5200	CONDENSER FANS												
	ELEC	0	0	0	0	433	757	1047	757	431	0	0	0	3,425
	PK	0.0	0.0	0.0	0.0	2.5	3.4	3.4	3.4	2.5	0.0	0.0	0.0	3.4
1	EQ5001	CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	2246	2377	2498	2498	2068	0	0	0	11,686
	PK	0.0	0.0	0.0	0.0	3.4	3.4	3.4	3.4	3.4	0.0	0.0	0.0	3.4
1	EQ5313	CONTROLS												
	ELEC	0	0	0	0	201	212	223	223	185	0	0	0	1,044
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.3
2	EQ1121L	AIR-CLD RECIP 35-60 TONS												

	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5200	CONDENSER FANS											
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5313	CONTROLS											
	ELEC	0	0	0	0	9	4	0	0	9	0	0	0
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.0
1	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	417	376	417	403	417	403	417	417	403	417	403	417
	PK	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
2	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	833	752	833	806	833	806	833	833	806	833	806	833
	PK	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
3	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	555	501	555	537	555	537	555	555	537	555	537	555
	PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
4	EQ4002	BI CENTRIF. FAN C.V.											
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1	EQ2001	GAS FIRE TUBE HOT WATER											
	GAS	665	645	455	107	0	0	0	0	0	141	296	824
	PK	3.1	3.3	2.7	1.1	0.0	0.0	0.0	0.0	0.0	1.8	2.0	3.6
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											
	ELEC	347	305	240	67	0	0	0	0	0	75	222	345
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6
1	EQ5240	BOILER FORCED DRAFT FAN											
	ELEC	761	670	526	147	0	0	0	0	0	165	488	757
	PK	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2
1	EQ5307	BOILER CONTROLS											
	ELEC	310	272	214	60	0	0	0	0	0	67	199	308
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5
1	EQ5013	WATER CIRC. PUMP C.V.											
	ELEC	278	236	276	50	0	0	0	0	0	278	257	278
	PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4
1	EQ5013	WATER CIRC. PUMP C.V.											

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 4109 OA NIGHTIME FT LEONARD WOOD

ELEC	278	236	276	50	0	0	0	0	0	278	257	278	1,652
PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 4109 OA DAYTIME FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	On Peak (Thrm/hr)
Jan	32,994	72	1,312	4
Feb	29,807	71	1,118	4
March	33,259	70	856	3
April	31,084	70	194	1
May	38,609	100	0	0
June	41,237	115	0	0
July	46,037	124	0	0
Aug	42,494	111	0	0
Sept	36,692	100	0	0
Oct	32,565	70	338	2
Nov	31,732	70	671	2
Dec	32,897	71	1,310	4
Total	429,406	124	5,798	4

Building Energy Consumption = 96,239 (Btu/Sq Ft/Year)  
Source Energy Consumption = 235,611 (Btu/Sq Ft/Year)

Floor Area = 21,253 (Sq Ft)

## EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													98,691
	ELEC	8341	7537	8544	8040	8442	8242	8240	8544	8040	8442	8040	8240	27.1
	PK	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	
1	MISC LD													181,645
	ELEC	15398	13910	15545	14877	15471	15024	15324	15545	14877	15471	14877	15324	43.5
	PK	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	
2	MISC LD													0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	MISC LD													0
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	MISC LD													0
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	MISC LD													0
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	MISC LD													0
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0.0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1	EQ1121L	AIR-CLD RECIP 35-60 TONS												35,481
	ELEC	0	0	0	0	4576	7697	11441	7783	3984	0	0	0	50.9
	PK	0.0	0.0	0.0	0.0	27.9	42.2	50.9	38.5	28.3	0.0	0.0	0.0	
1	EQ5200	CONDENSER FANS												3,068
	ELEC	0	0	0	0	406	672	956	675	358	0	0	0	3.4
	PK	0.0	0.0	0.0	0.0	2.4	3.4	3.4	3.1	2.4	0.0	0.0	0.0	
1	EQ5001	CHILLED WATER PUMP C.V.												11,431
	ELEC	0	0	0	0	2159	2276	2498	2377	2122	0	0	0	3.4
	PK	0.0	0.0	0.0	0.0	3.4	3.4	3.4	3.4	3.4	0.0	0.0	0.0	
1	EQ5313	CONTROLS												1,021
	ELEC	0	0	0	0	193	203	223	212	190	0	0	0	0.3
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	
2	EQ1121L	AIR-CLD RECIP 35-60 TONS												

	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5200	CONDENSER FANS											
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5001	CHILLED WATER PUMP C.V.											
	ELEC	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	EQ5313	CONTROLS											
	ELEC	0	0	0	0	8	5	0	4	4	0	0	0
	PK	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0
1	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	417	376	417	403	417	403	417	417	403	417	403	417
	PK	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
2	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	833	752	833	806	833	806	833	833	806	833	806	833
	PK	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
3	EQ4003	FC CENTRIF. FAN C.V.											
	ELEC	555	501	555	537	555	537	555	555	537	555	537	555
	PK	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
4	EQ4002	BI CENTRIF. FAN C.V.											
	ELEC	5550	5013	5550	5371	5550	5371	5550	5550	5371	5550	5371	5550
	PK	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
1	EQ2001	GAS FIRE TUBE HOT WATER											
	GAS	1312	1118	856	194	0	0	0	0	0	338	671	1310
	PK	4.5	3.7	3.2	1.3	0.0	0.0	0.0	0.0	0.0	2.0	2.3	3.9
1	EQ5020	HEAT WATER CIRC. PUMP C.V.											
	ELEC	329	297	309	125	0	0	0	0	0	181	284	348
	PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6
1	EQ5240	BOILER FORCED DRAFT FAN											
	ELEC	723	652	677	275	0	0	0	0	0	398	623	764
	PK	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2
1	EQ5307	BOILER CONTROLS											
	ELEC	294	265	276	112	0	0	0	0	0	162	253	311
	PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5
1	EQ5013	WATER CIRC. PUMP C.V.											
	ELEC	278	251	278	269	0	0	0	0	0	278	269	278
	PK	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4
1	EQ5013	WATER CIRC. PUMP C.V.											



**COMPUTER SIMULATIONS**

BUILDING 5265

**E M C ENGINEERS, INC**

DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)

CALCULATED BY: BHS

CHECKED BY: AJN

DATE: 18-Mar-93

BUILDING NO.: 5265

BLDG. TYPE: GENERAL MAINTENANCE

**ENERGY CONSTANT CALCULATIONS**

ECC	38169 KWH -	37431 KWH	=	4.83E-06 KWH/CFM-HR
	194980 CFM *	784 HR/YR		
ECHC	38169 KWH -	37431 KWH	=	1.61E-06 KWH/CFM-HR
	194980 CFM *	2346 HR/YR		
NSUCHC	65786 KWH -	50566 KWH	=	1.22E-05 KWH/CFM-HR
	194980 CFM *	6414 HR/YR		
NSUCC	65786 KWH -	50566 KWH	=	3.64E-05 KWH/CFM-HR
	194980 CFM *	2144 HR/YR		
DDCCHC	50566 KWH -	38169 KWH	=	2.71E-05 KWH/CFM-HR
	194980 CFM *	2346 HR/YR		
DDCCC	50566 KWH -	38169 KWH	=	8.11E-05 KWH/CFM-HR
	194980 CFM *	784 HR/YR		
NSC	22730.4 MBtu -	17142.9 MBtu	=	8.53E+04 Btu/UA
	65507 UA			
DSC	17142.9 MBtu -	15648.1 MBtu	=	2.28E+04 Btu/UA
	65507 UA			
OPT	(2 HR/DAY X 272 DAY/YR) -	294 HR/YR	=	250 HR/YR
CHWR	(0.915 kW X 0.012 Eff. X 632 HRS X 2 Degrees of Reset)		=	13.9 KWH/TON
OAR	506 HR/YR *	0.01	=	5.06 HR/YR

**E M C ENGINEERS, INC**  
DENVER • ATLANTA • GERMANY

JOB: FT. LEONARD WOOD, MO (EMC #3204.000)  
CALCULATED BY: BHS  
CHECKED BY: AJN  
DATE: 18-Mar-93  
BUILDING NO.: 5265  
BLDG. TYPE: GENERAL MAINTENANCE

**ENERGY CONSTANT CALCULATIONS**

	BASERUN	RUN1	RUN2	RUN3	RUN4	RUN5
HEATING (MBtu)	22730	17143	15648	15648	5185	5229
COOLING (KWH)	65786	50566	38169	37431	62724	60176

SUPPLY AIR FAN	194980 CFM
FLOOR AREA	198876 FT²
CFMI	29112 CFM
UA	65507 BTU/HR • °F
BUILDING CONST	2 (1 FOR LIGHT) (2 FOR HEAVY)

BEACON RUN DEFINITION:	
BASERUN	EXISTING OPERATION
RUN1	NIGHT SETBACK
RUN2	DDC CONTROL
RUN3	ECONOMIZER
RUN4	NIGHTTIME INFILTRATION (OA)
RUN5	DAYTIME INFILTRATION (OA)

HOURS OF OCCUPANCY			ANNUAL HEATING & COOLING HOURS	
M-F	700	1600	45 HR	HR. ON HEATING 1170 HR/YR
SAT.			0 HR	HR. ON COOLING 784 HR/YR
SUN.			0 HR	HR. OFF HEATING 3198 HR/YR
	TOTAL OCCUPY HR.		45 HR/WK	HR. OFF COOLING 2144 HR/YR
	TOTAL UNOCC. HR.		123 HR/WK	
	ANNUAL OCCUPY HR.		2346 HR/YR	
	ANNUAL UNOCC. HR.		6414 HR/YR	

PRESENT HR. OF OPERATION FOR SYS. WITH HEATING AND COOLING 8760 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH HEATING ONLY 4368 HR/YR  
PRESENT HR. OF OPERATION FOR SYS. WITH COOLING ONLY 2928 HR/YR

HOUR SAVE (HEATING ONLY) 4368 - 1170 = 3198 HR/YR  
HOUR SAVE (COOLING ONLY) 2928 - 784 = 2144 HR/YR

HOAUHC	22730.4 MBtu -	5184.7 MBtu	=	9.40E+01 Btu/CFM-HR
	29112 CFM *	6414 HR/YR		
HOAUH	22730.4 MBtu -	5184.7 MBtu	=	1.88E+02 Btu/CFM-HR
	29112 CFM *	3198 HR/YR		
COAUHC	65786 KWH -	62724 KWH	=	1.64E-05 KWH/CFM-HR
	29112 CFM *	6414 HR/YR		
COAUH	65786 KWH -	62724 KWH	=	4.91E-05 KWH/CFM-HR
	29112 CFM *	2144 HR/YR		
HOAOHC	22730.4 MBtu -	5229.4 MBtu	=	2.56E+02 Btu/CFM-HR
	29112 CFM *	2346 HR/YR		
HOAOH	22730.4 MBtu -	5229.4 MBtu	=	5.14E+02 Btu/CFM-HR
	29112 CFM *	1170 HR/YR		
COAOHC	65786 KWH -	60176 KWH	=	8.21E-05 KWH/CFM-HR
	29112 CFM *	2346 HR/YR		
COAOH	65786 KWH -	60176 KWH	=	2.46E-04 KWH/CFM-HR
	29112 CFM *	784 HR/YR		
DC 1 / 6 (10 MINUTES PER HOUR)			=	0.17
DC DEMAND 1 / 6 (10 MINUTES PER HOUR)			=	0.17

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 5265BHL1

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 5265 BLDG NAME: GENERAL MAINTENANCE FACILITY ZONE 1 (UH's)

BLDG FUNCTION: REPAIR AND MAINTENANCE

FLOOR AREA: (SQ. FT) 19,255

# FLOORS 1

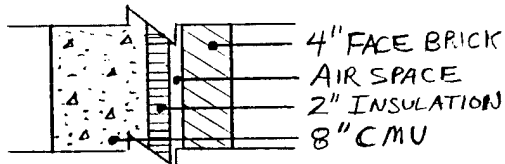
SLAB PERIMETER: (FT) 936

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	5,600	0	8,635	11,145	25,380
GLASS	(SQ. FT)	1,227	0	1,027	1,200	3,454
PERSONNEL DOOR,	(SQ. FT)	21	0	84	140	245
OVERHEAD DOOR,	(SQ. FT)	224	0	2,184	2,464	4,872
WALLS, NET	(SQ. FT)	4,128	0	5,340	7,341	16,809
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					19,923
OVERHEAD DOOR	(SQ. FT)	4,872	PERSONNEL DOOR	(SQ. FT)		245
INSULATED PANELS	(SQ. FT)	2,800	0	4,318	6,470	13,588

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

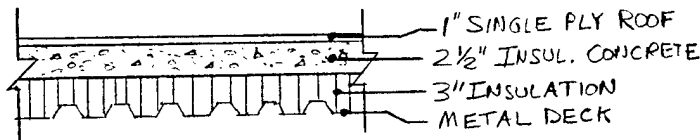
WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" CONCRETE BLOCK	2.02
6. INSIDE AIR FILM	0.68
7. TOT. MASONRY WALL	10.89
8. TOT. INSUL. PANEL	7.53
TOTAL R-WALL =	8.17
U=1/R	0.122

TOTAL R-WALL = [(INSUL. PANEL SQ.FT. X R-PANEL) + (MASONRY WALL SQ.FT. X R-MASONRY WALL)] / TOTAL SQ.FT.

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 1" SINGLE PLY ROOF	0.88
3. 2.5" INSUL. CONCRETE	2.70
4. 3" RIGID INSULATION	10.03
5. METAL DECK	0.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.46
U=1/R	0.069

GLASS TYPE:	DOUBLE PANE TRANSLUCENT FIBERGLASS	R-GLASS	1.76
SLAB TYPE FLOOR:	CONCRETE	SLF	0.66
INSULATED PANEL TYPE:	METAL WITH 2" INSULATION	R-PANEL	7.53
OVERHEAD DOOR TYPE:	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)	H	25380	X CFM / SQ.FT.	0.685	= 17,373
DOOR OPENINGS / HR - SINGLE DOOR	20	X CFM / OPENING / HR	1.600	=	32
DOOR OPENINGS / HR - DOUBLE DOORS	10	X CFM / OPENING / HR	1.385	=	14
TOTAL INFILTRATION (CFM)					17419

UA ODOOR	= ODOOR AREA	4,872	X DOOR 'U'	0.952	=	4,640
UA PDOOR	= PDOOR AREA	245	X DOOR 'U'	0.391	=	96
UA WALL	= WALL AREA	16,809	X WALL 'U'	0.122	=	2,056
UA ROOF	= ROOF AREA	19,923	X ROOF 'U'	0.069	=	1,378
UA GLASS	= GLASS AREA	3,454	X GLASS 'U'	0.568	=	1,963
UA SLAB	= SLAB PERIM.	936	X SLF	0.660	=	618
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	17419	X A. T. F.	1.035	=	18,029
TOTAL UA (BTU/HR°F)						28,779

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 5265BHL2

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 5265 BLDG NAME: GENERAL MAINTENANCE FACILITY ZONE 2 (HV UNITS)

BLDG FUNCTION: REPAIR AND MAINTENANCE

FLOOR AREA: (SQ. FT) 65,268

# FLOORS 1

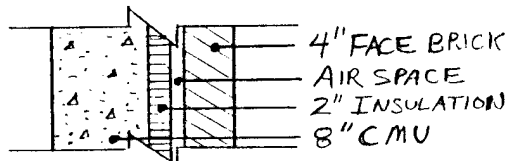
SLAB PERIMETER: (FT) 64

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	1,232	0	0	390	1,622
GLASS	(SQ. FT)	293	0	0	0	293
PERSONNEL DOOR,	(SQ. FT)	0	0	0	112	112
OVERHEAD DOOR,	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	939	0	0	278	1,217
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 64,800
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR		(SQ. FT)	112
INSULATED PANELS	(SQ. FT)	616	0	0	250	866

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

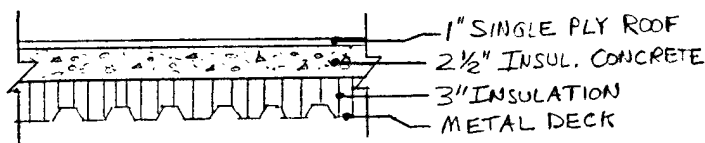
WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" CONCRETE BLOCK	2.02
6. INSIDE AIR FILM	0.68
7. TOT. MASONRY WALL	10.89
8. TOT. INSUL. PANEL	7.53
TOTAL R-WALL =	8.50
U=1/R	0.118

TOTAL R-WALL = [(INSUL. PANEL SQ.FT. X R-PANEL) + (MASONRY WALL SQ.FT. X R-MASONRY WALL)] / TOTAL SQ.FT.

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 1" SINGLE PLY ROOF	0.88
3. 2.5" INSUL. CONCRETE	2.70
4. 3" RIGID INSULATION	10.03
5. METAL DECK	0.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.46
U=1/R	0.069

GLASS TYPE:	DOUBLE PANE TRANSLUCENT FIBERGLASS	R-GLASS	1.76
SLAB TYPE FLOOR:	CONCRETE	SLF	0.66
INSULED PANEL TYPE:	METAL WITH 2" INSULATION	R-PANEL	7.53
OVERHEAD DOOR TYPE:	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	1622	X CFM / SQ.FT.	0.115	= 187
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	20		X CFM / OPENING / HR	1.385	= 28
TOTAL INFILTRATION (CFM)					214

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.952	=	0
UA PDOOR	= PDOOR AREA	112	X DOOR 'U'	0.391	=	44
UA WALL	= WALL AREA	1,217	X WALL 'U'	0.118	=	143
UA ROOF	= ROOF AREA	64,800	X ROOF 'U'	0.069	=	4,481
UA GLASS	= GLASS AREA	293	X GLASS 'U'	0.568	=	166
UA SLAB	= SLAB PERIM.	64	X SLF	0.660	=	42
UA BASEM.	= B-WALL AREA	0	X BASE 'U'	0.000	=	0
INFILTRATION	= CFM	214	X A. T. F.	1.035	=	222

TOTAL UA (BTU/HR°F) 5,099

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 5265BHL3

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 5265 BLDG NAME: GENERAL MAINTENANCE FACILITY ZONE 3 (AC UNITS)

BLDG FUNCTION: OFFICE AREA / LOUNGE AREA

FLOOR AREA: (SQ. FT)

4,216

# FLOORS 1

SLAB PERIMETER: (FT)

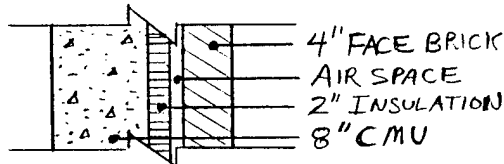
84

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	0	0	841	841
GLASS	(SQ. FT)	0	0	0	120	120
PERSONNEL DOOR,	(SQ. FT)	0	0	0	0	0
OVERHEAD DOOR,	(SQ. FT)	0	0	0	0	0
WALLS, NET	(SQ. FT)	0	0	0	721	721
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					0
OVERHEAD DOOR	(SQ. FT)	0	PERSONNEL DOOR	(SQ. FT)		0
INSULATED PANELS	(SQ. FT)	0	0	0	224	224

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

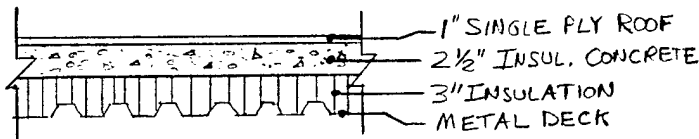
WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" CONCRETE BLOCK	2.02
6. INSIDE AIR FILM	0.68
7. TOT. MASONRY WALL	10.89
8. TOT. INSUL. PANEL	7.53
TOTAL R-WALL =	9.85
U=1/R	0.102

TOTAL R-WALL = [(INSUL. PANEL SQ.FT. X R-PANEL) + (MASONRY WALL SQ.FT. X R-MASONRY WALL)] / TOTAL SQ.FT.

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 1" SINGLE PLY ROOF	0.88
3. 2.5" INSUL. CONCRETE	2.70
4. 3" RIGID INSULATION	10.03
5. METAL DECK	0.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.46
U=1/R	0.069

GLASS TYPE:	DOUBLE PANE TRANSLUCENT FIBERGLASS	R-GLASS	1.76
SLAB TYPE FLOOR:	CONCRETE	SLF	0.66
INSULED PANEL TYPE:	METAL WITH 2" INSULATION	R-PANEL	7.53
OVERHEAD DOOR TYPE:	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	841	X CFM / SQ.FT.	0.115	= 97
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS			X CFM / OPENING / HR	1.385	= 0
		TOTAL INFILTRATION (CFM)		=	97

UA ODOOR	= ODOOR AREA	0	X DOOR 'U'	0.952	=	0
UA PDOOR	= PDOOR AREA	0	X DOOR 'U'	0.391	=	0
UA WALL	= WALL AREA	721	X WALL 'U'	0.102	=	73
UA ROOF	= ROOF AREA	0	X ROOF 'U'	0.069	=	0
UA GLASS	= GLASS AREA	120	X GLASS 'U'	0.568	=	68
UA SLAB	= SLAB PERIM.	84	X SLF	0.660	=	55
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	97	X A. T. F.	1.035	=	100

TOTAL UA (BTU/HR°F) 297

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 5265BHL4

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 5265 BLDG NAME: GENERAL MAINTENANCE FACILITY ZONE 4 (UH's)

BLDG FUNCTION: REPAIR AND MAINTENANCE

FLOOR AREA: (SQ. FT)

8,520

# FLOORS 1

SLAB PERIMETER: (FT)

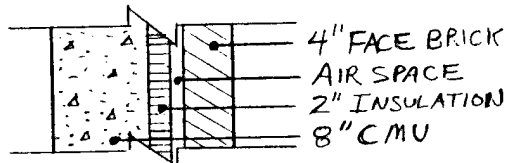
403

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	0	9,940	672	672	11,284
GLASS	(SQ. FT)	0	1,000	120	160	1,280
PERSONNEL DOOR,	(SQ. FT)	0	126	0	0	126
OVERHEAD DOOR,	(SQ. FT)	0	2,688	84	0	2,772
WALLS, NET	(SQ. FT)	0	6,126	468	512	7,106
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					8,520
OVERHEAD DOOR	(SQ. FT)	2,772				126
INSULATED PANELS	(SQ. FT)	0	4,970	336	336	5,642

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

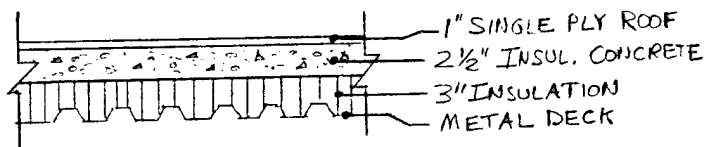
WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" CONCRETE BLOCK	2.02
6. INSIDE AIR FILM	0.68
7. TOT. MASONRY WALL	10.89
8. TOT. INSUL. PANEL	7.53
TOTAL R-WALL =	8.22
U=1/R	0.122

TOTAL R-WALL = (INSUL. PANEL SQ.FT. X R-PANEL) + (MASONRY WALL SQ.FT. X R-MASONRY WALL) / TOTAL SQ.FT.

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 1" SINGLE PLY ROOF	0.88
3. 2.5" INSUL. CONCRETE	2.70
4. 3" RIGID INSULATION	10.03
5. METAL DECK	0.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.46
U=1/R	0.069

GLASS TYPE:	DOUBLE PANE TRANSLUCENT FIBERGLASS	R-GLASS	1.76
SLAB TYPE FLOOR:	CONCRETE	SLF	0.66
INSULATED PANEL TYPE:	METAL WITH 2" INSULATION	R-PANEL	7.53
OVERHEAD DOOR TYPE:	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
LEAKY WALL H/M/L (SQ.FT.)	H	11284	X CFM / SQ.FT.	0.693	= 7,824
DOOR OPENINGS / HR - SINGLE DOOR	80	X CFM / OPENING / HR	1.600	=	128
DOOR OPENINGS / HR - DOUBLE DOORS		X CFM / OPENING / HR	1.385	=	0
		TOTAL INFILTRATION (CFM)		=	7952

UA ODOOR	= ODOOR AREA	2,772	X DOOR 'U'	0.952	=	2,640
UA PDOOR	= PDOOR AREA	126	X DOOR 'U'	0.391	=	49
UA WALL	= WALL AREA	7,106	X WALL 'U'	0.122	=	864
UA ROOF	= ROOF AREA	8,520	X ROOF 'U'	0.069	=	589
UA GLASS	= GLASS AREA	1,280	X GLASS 'U'	0.568	=	727
UA SLAB	= SLAB PERIM.	403	X SLF	0.660	=	266
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	7952	X A. T. F.	1.035	=	8,231

**TOTAL UA (BTU/HR°F) 13,367**

**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 5265BHL5

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 5265 BLDG NAME: GENERAL MAINTENANCE FACILITY ZONE 5 (HV UNITS)

BLDG FUNCTION: REPAIR AND MAINTENANCE

FLOOR AREA: (SQ. FT) 75,060

# FLOORS 1

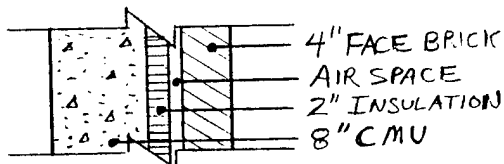
SLAB PERIMETER: (FT) 784

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	5,236	7,513	4,375	2,912	20,036
GLASS	(SQ. FT)	1,247	1,687	991	587	4,512
PERSONNEL DOOR,	(SQ. FT)	42	105	77	21	245
OVERHEAD DOOR,	(SQ. FT)	0	756	364	224	1,344
WALLS, NET	(SQ. FT)	3,947	4,965	2,943	2,080	13,935
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)	(SQ. FT)					73,017
OVERHEAD DOOR	(SQ. FT)	1,344				1,344
PERSONNEL DOOR	(SQ. FT)					245
INSULATED PANELS	(SQ. FT)	2,619	3,165	1,900	1,456	9,140

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

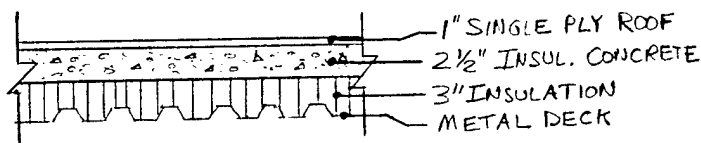
WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" CONCRETE BLOCK	2.02
6. INSIDE AIR FILM	0.68
7. TOT. MASONRY WALL	10.89
8. TOT. INSUL. PANEL	7.53
TOTAL R-WALL =	8.69
U=1/R	0.115

TOTAL R-WALL = [(INSUL. PANEL SQ.FT. X R-PANEL) + (MASONRY WALL SQ.FT. X R-MASONRY WALL)] / TOTAL SQ.FT.

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 1" SINGLE PLY ROOF	0.88
3. 2.5" INSUL. CONCRETE	2.70
4. 3" RIGID INSULATION	10.03
5. METAL DECK	0.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.46
U=1/R	0.069

GLASS TYPE:	DOUBLE PANE TRANSLUCENT FIBERGLASS	R-GLASS	1.76
SLAB TYPE FLOOR:	CONCRETE	SLF	0.66
INSULATED PANEL TYPE:	METAL WITH 2" INSULATION	R-PANEL	7.53
OVERHEAD DOOR TYPE:	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	M	20036	X CFM / SQ.FT.	0.115	= 2,304
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR	50	X CFM / OPENING / HR	1.600	=	80
DOOR OPENINGS / HR - DOUBLE DOORS	10	X CFM / OPENING / HR	1.385	=	14
TOTAL INFILTRATION (CFM)				=	2398

UA ODOOR	= ODOOR AREA	1,344	X DOOR 'U'	0.952	=	1,280
UA PDOOR	= PDOOR AREA	245	X DOOR 'U'	0.391	=	96
UA WALL	= WALL AREA	13,935	X WALL 'U'	0.115	=	1,604
UA ROOF	= ROOF AREA	73,017	X ROOF 'U'	0.069	=	5,050
UA GLASS	= GLASS AREA	4,512	X GLASS 'U'	0.568	=	2,564
UA SLAB	= SLAB PERIM.	784	X SLF	0.660	=	517
UA BASEM.	= B-WALL AREA	0	X BASE. 'U'	0.000	=	0
INFILTRATION	= CFM	2398	X A. T. F.	1.035	=	2,482

TOTAL UA (BTU/HR°F) 13,592



**E M C ENGINEERS, INC.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY

CLIENT CONTRACT NO.: DACA 41-92-C-0098

CLIENT PROJ. ENG.: DOUG CAGE

LOCATION: FT LEONARD WOOD

DATE: 22-Feb-93

BY: TMB

JOB: 3204.000

CHK: AJN

FILE: 5265BHL6

**BUILDING HEATING LOAD CALCULATION SHEET**

BLDG NO: 5265 BLDG NAME: GENERAL MAINTENANCE FACILITY ZONE 6 (AC UNITS)

BLDG FUNCTION: OFFICE AREA / LOUNGE AREA

FLOOR AREA: (SQ. FT) 26,557

# FLOORS 1

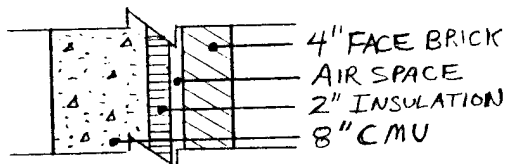
SLAB PERIMETER: (FT) 415

**I. AREAS: ([ ] FIELD VERIFIED ELEVATION PLANS)**

		NORTH	SOUTH	EAST	WEST	TOTAL
WALLS, GROSS	(SQ. FT)	5,538	750	1,092	0	7,380
GLASS	(SQ. FT)	315	145	108	0	568
PERSONNEL DOOR,	(SQ. FT)	84	0	0	0	84
OVERHEAD DOOR,	(SQ. FT)	280	0	0	0	280
WALLS, NET	(SQ. FT)	4,859	605	984	0	6,448
ROOF AREA (OR CEILING AREA IF ATTIC IS UNCONDITIONED)						(SQ. FT) 24,109
OVERHEAD DOOR	(SQ. FT)	280	PERSONNEL DOOR		(SQ. FT)	84
INSULATED PANELS	(SQ. FT)	3,325	200	682	0	4,207

**II. CONSTRUCTION: ([ ] FIELD VERIFIED WALL, ROOF, WINDOW, DOOR TYPES)**

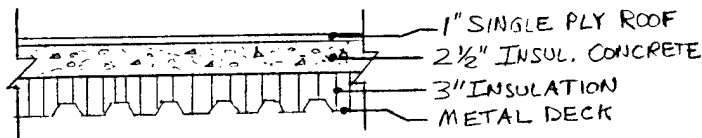
WALLS: (SKETCH CROSS SECTION OF WALL)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 4" FACE BRICK	0.43
3. AIR SPACE	0.91
4. 2" RIGID INSULATION	6.68
5. 8" CONCRETE BLOCK	2.02
6. INSIDE AIR FILM	0.68
7. TOT. MASONRY WALL	10.89
8. TOT. INSUL. PANEL	7.53
TOTAL R-WALL =	8.70
U=1/R	0.115

TOTAL R-WALL = [(INSUL. PANEL SQ.FT. X R-PANEL) + (MASONRY WALL SQ.FT. X R-MASONRY WALL)] / TOTAL SQ.FT.

ROOF: (SKETCH CROSS SECTION OF ROOF)



COMPONENTS	R-VALUE
1. OUTSIDE AIR FILM	0.17
2. 1" SINGLE PLY ROOF	0.88
3. 2.5" INSUL. CONCRETE	2.70
4. 3" RIGID INSULATION	10.03
5. METAL DECK	0.00
6.	
7. INSIDE AIR FILM	0.68
TOTAL R-ROOF =	14.46
U=1/R	0.069

GLASS TYPE:	DOUBLE PANE TRANSLUCENT FIBERGLASS	R-GLASS	1.76
SLAB TYPE FLOOR:	CONCRETE	SLF	0.66
INSULATED PANEL TYPE:	METAL WITH 2" INSULATION	R-PANEL	7.53
OVERHEAD DOOR TYPE:	METAL	R-ODOOR	1.05
PERSONNEL DOOR TYPE:	METAL	R-PDOOR	2.56

**III. INFILTRATION:**

TIGHT WALL H/M/L (SQ.FT.)		X CFM / SQ.FT.	0.000	=	0
AVG. WALL H/M/L (SQ.FT.)	H	7380	X CFM / SQ.FT.	0.138	= 1,018
LEAKY WALL H/M/L (SQ.FT.)			X CFM / SQ.FT.	0.000	= 0
DOOR OPENINGS / HR - SINGLE DOOR			X CFM / OPENING / HR	1.600	= 0
DOOR OPENINGS / HR - DOUBLE DOORS	10		X CFM / OPENING / HR	1.385	= 14
TOTAL INFILTRATION (CFM)				=	1032

UA ODOOR	= ODOOR AREA	280	X DOOR 'U'	0.952	=	267
UA PDOOR	= PDOOR AREA	84	X DOOR 'U'	0.391	=	33
UA WALL	= WALL AREA	6,448	X WALL 'U'	0.115	=	741
UA ROOF	= ROOF AREA	24,109	X ROOF 'U'	0.069	=	1,667
UA GLASS	= GLASS AREA	568	X GLASS 'U'	0.568	=	323
UA SLAB	= SLAB PERIM.	415	X SLF	0.660	=	274
UA BASEM.	= B-WALL AREA	0	X BASE 'U'	0.000	=	0
INFILTRATION	= CFM	1032	X A. T. F.	1.035	=	1,068
TOTAL UA (BTU/HR°F)						4,373

EMC NO.: 3204-000

11-Feb-93

**PREPARED BY:**

**CHECKED BY:** CEL

5265Z1

FILE: 5265Z1  
BLDG: 5265  
ZONE: 1

## Rates of Heat Gain from Occupants of Conditioned Spaces

Rates of Heat Gain from Occupants of Condensed Pipes						
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	TOT. Latent (BTU/H)
1	10	6	Light bench work	Factory	275	475
						2,750
						4,750
TOTAL	10				TOTAL	2,750
						4,750

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
1	34	30	Tungsten-Halogen - 250w	250	8,500
	23	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	1,932
	6	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	1,008
	4	61	Exit Light	20	80
TOTAL	67			TOTAL	11,520

### Peak Value for Internal Gains

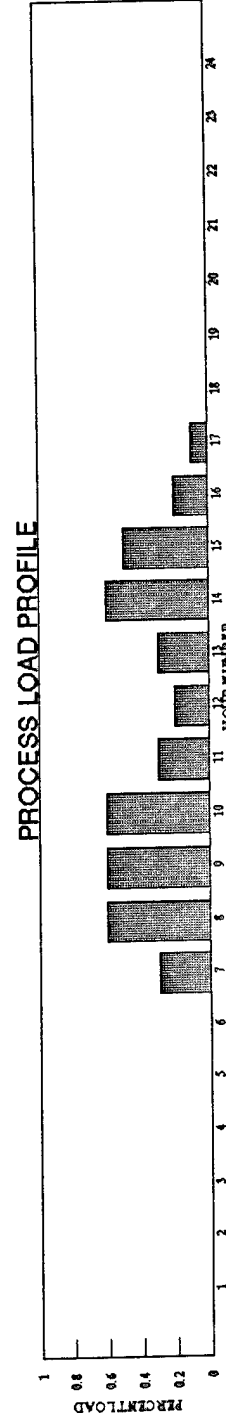
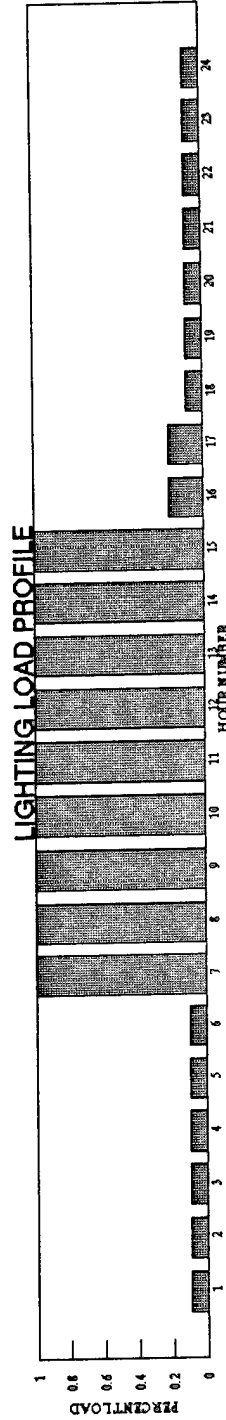
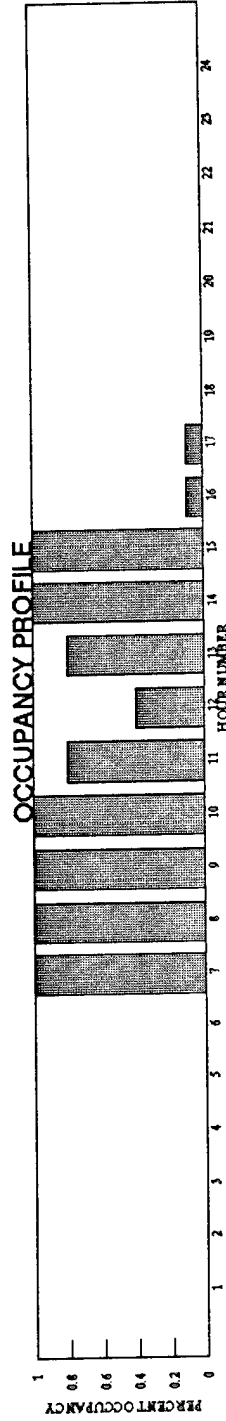
<b>Peak Value for Internal Gains</b>						
<b>Zone No.</b>	<b>No. of Equipment</b>	<b>Equip. Type</b>	<b>Description</b>	<b>Average Wattage</b>	<b>Heat Gain to Space(%)</b>	<b>Total Total Wattlege (BTU)</b>
1	4	3 Ton Crane		746	5%	2,984
	2	10 Ton Crane		2,238	5%	15,277
	10	Small Industrial Machines		1,492	10%	14,920
			TOTAL		8%	22,380
						76,383

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265Z1  
 BLDG: 5265  
 ZONE: 1

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																								
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
7	Gen. Maint.	OCCUPANCY							1	1	1	1	0.8	0.4	0.8	1	1	0.1	0.1								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
		PROCESS						0.3	0.6	0.6	0.6	0.6	0.3	0.2	0.3	0.6	0.5	0.2	0.1								



3204-000

**CLIENT:** E M O Engineers, Inc.  
**PROJECT:** EEAP. EMCS EXPANSION FEASIBILITY STUDY

DATE: \_\_\_\_\_

PROJECT: EEAF, EMCS EXPANSION / CASIDIENT  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098

**PREPARED BY:** T.M.B.

CLIENT PROJ. ENG: DOUG CAGE

**CHECKED BY:**

**LOCATION: FT. LEONARD WOOD**

276970

**ZONE: 2**

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat. (BTU/H)
2	80	6	Light bench work	Factory	275	475	22,000	38,000
TOTAL	80					TOTAL	22,000	38,000

### Peak Wattage Value for Lights

[illegible]

## Peak Value for Internal Gains

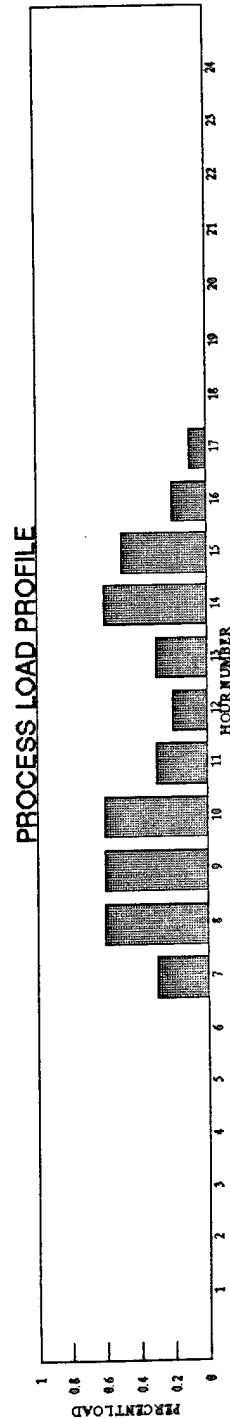
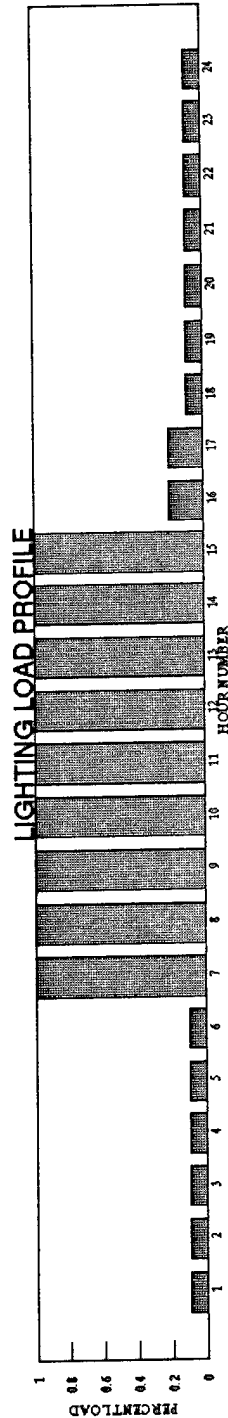
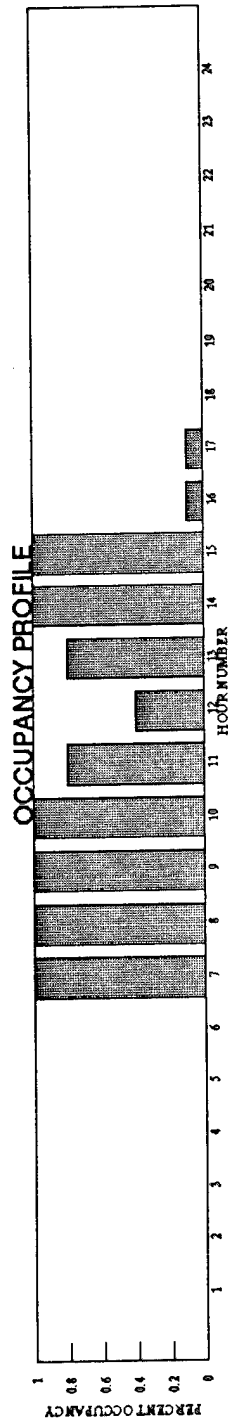
[illegible]

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265Z2  
 BLDG: 5265  
 ZONE: 2

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7	Gen. Maint.	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.4	0.8	1	1	0.1	0.1							
		PROCESS							0.3	0.6	0.6	0.6	0.3	0.2	0.3	0.6	0.5	0.2	0.1							



EMC NO.: 3204--000

11-Feb-93

**T.M.B.**

CEL

526573

**ZONE: 3**

# Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT. Lat. (BTU/H)
3	15	4	Seated, light work, typing	Offices, hotels, apts	250	200	3,000
TOTAL	15					TOTAL	3,750 3,000

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
3	6	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	504
	34	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	5,712
TOTAL	40			TOTAL	6,216

## Peak Value for Internal Gains

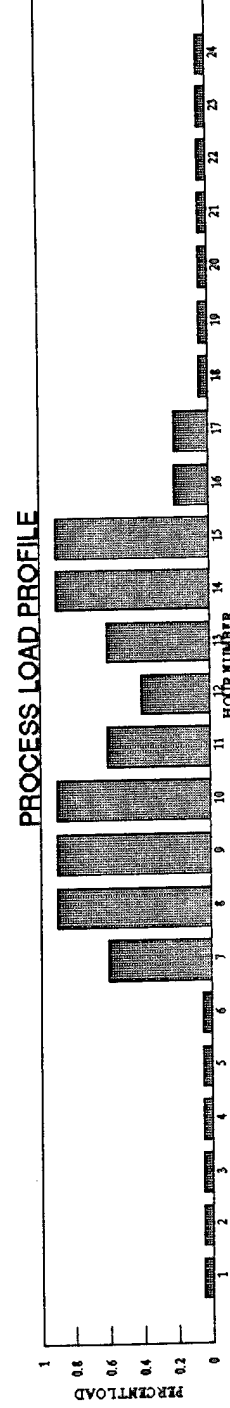
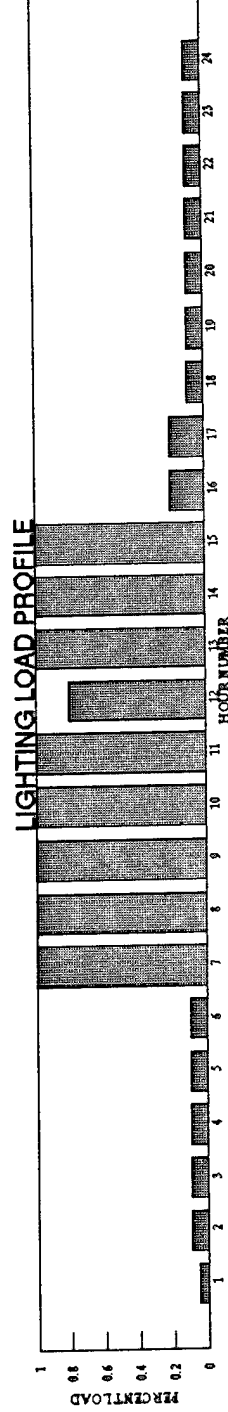
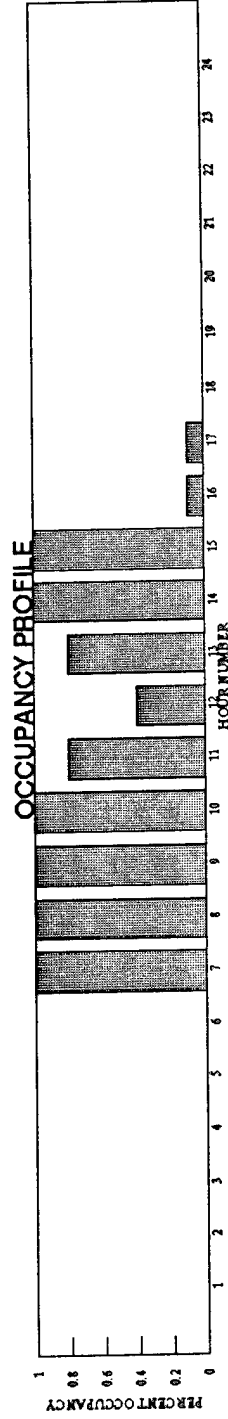
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
3	7	3	Microcomputer	350	91%	2,450	8,362
	6	5	Printer (laser)	870	34%	5,220	17,816
	4	45	Micro Fiche Machine	250	50%	1,000	3,413
	1	31	Fan (Circulating)	88	20%	88	300
	4	12	Typewriter	100	10%	400	1,365
	1	46	Microwave Oven	600	65%	600	2,048
	1	49	Radio	71	10%	71	242
	2	24	Coffee Maker	1,500	30%	3,000	10,239
	2	53	Refrigerator (12 cu. ft.)	241	20%	482	1,645
	1	54	Coke Machine	321	35%	321	1,096
				TOTAL	45%	13,632	46,526

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265Z3  
 BLDG: 5265  
 ZONE: 3

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.4	0.8	1	1	0.1	0.1							
		PROCESS	0.05	0.05	0.05	0.05	0.05	0.05	0.6	0.9	0.9	0.9	0.6	0.4	0.6	0.9	0.9	0.2	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05



# EM C Engineers, Inc.

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 526524  
 BLDG: 5265  
 ZONE: 4

## Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT. Lat. (BTU/H)
4	10	6	Light bench work	Factory	275	475	2,750	4,750
TOTAL	10						2,750	4,750

## Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
4	14	57	HPS -- Mogul Base, 250w with 55w ballast	305	4,270
	6	61	Exit Light	20	120
TOTAL	20				4,390

## Peak Value for Internal Gains

Zone No.	No. of Equipmen	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage	Total (BTU)
4	2	3	Ton Crane	746	5%	1,492	5,092
	1	10	Ton Crane	2,238	5%	2,238	7,638
	8		Small Industrial Machines	1,492	10%	11,936	40,738
TOTAL					9%	15,666	53,468

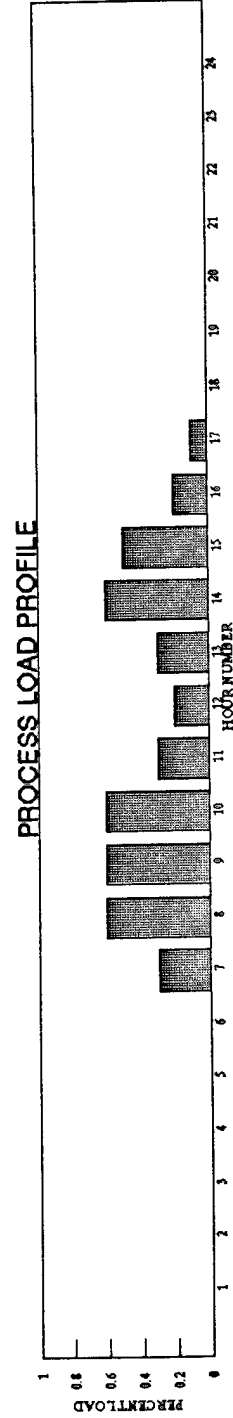
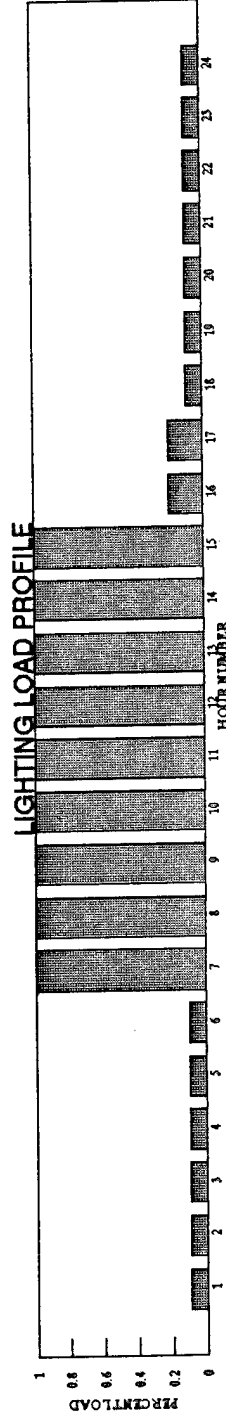
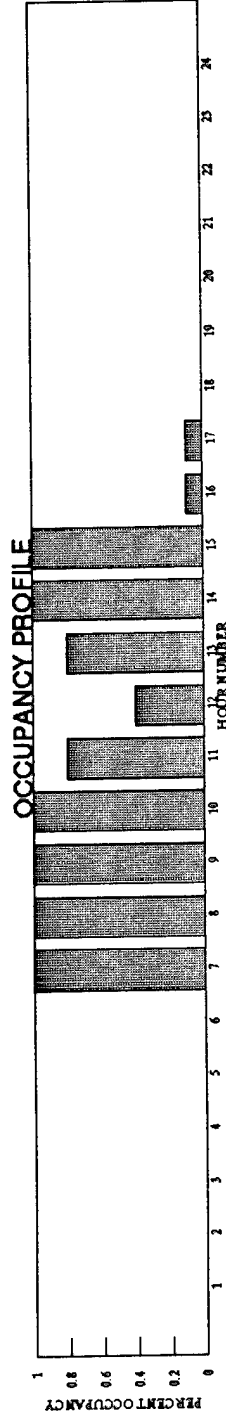


# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265ZA  
 BLDG: 5265  
 ZONE: 4

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7	Gen. Maint.	OCCUPANCY						1	1	1	1	0.8	0.4	0.8	1	1	0.1	0.1								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		PROCESS						0.3	0.6	0.6	0.6	0.3	0.2	0.3	0.6	0.5	0.2	0.1								



PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
CLIENT PROJ. ENG: DOUG CAGE  
LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
DATE: 11-Feb-93  
PREPARED BY: T.M.B.  
CHECKED BY: CEL  
FILE: 5265Z5  
BIDG: 5265

**ZONE:**

Rates of Heat Gain from Occupants of Conditioned Spaces						
Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	TOT. Lat (BTU/H)
5	50	6	Light bench work	Factory	275	475
						13,750
						23,750
TOTAL	50				TOTAL	13,750
						23,750

Peak Wattage Value for Lights					
Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
5	164	57	HPS – Mogul Base, 250w with 55w ballast	305	50,020
	124	6	Fluorescent, 2 – 34w lamps, 16w ballast (2x4 ft. fixture)	84	10,416
	6	8	Fluorescent, 4 – 34w lamps, 2 – 16w ballasts (2x4 ft. fix.)	168	1,008
	8	19	Incandescent – 75w	75	600
	10	61	Exit Light	20	200
TOTAL	312			TOTAL	62,244

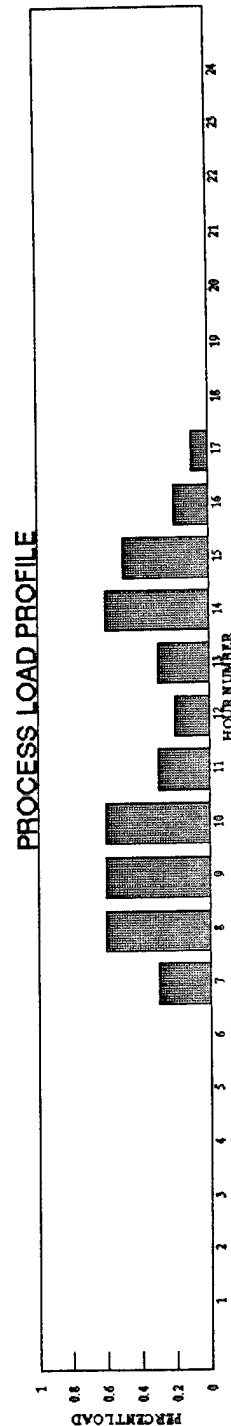
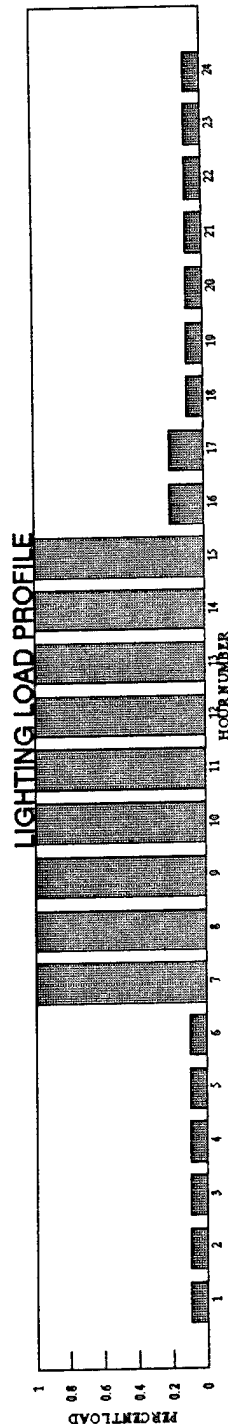
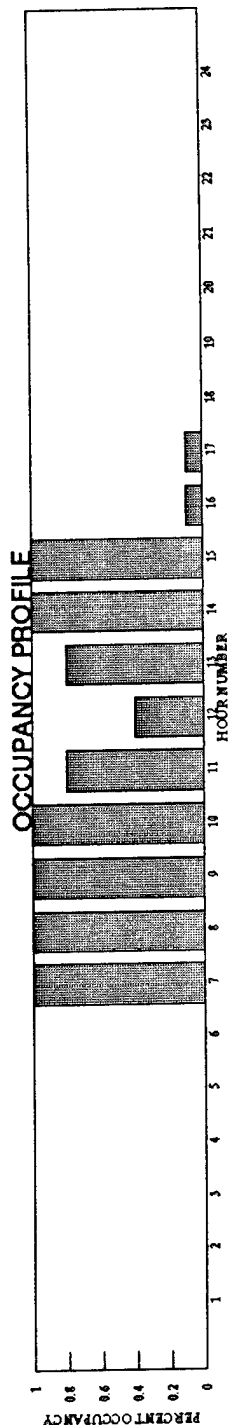
Peak Value for Internal Gains						
Zone No.	No. of Equipment	Equip. Type	Description	Average Wattage	Heat Gain to Space(%)	Total Wattage
5	6		3 Ton Crane	746	5%	4,476
	10		10 Ton Crane	2,238	5%	22,380
	15		Wood Shop Industrial Tools	1,120	10%	16,800
	25		Small Industrial Machines (grinders, drills, etc.)	1,492	10%	37,300
	3	58	Sewing Machine	75	20%	225
	2	46	Microwave Oven	600	65%	1,200
	2	24	Coffee Maker	1,500	30%	3,000
			TOTAL		10%	85,381
						291,405

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41-92-C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265 Z5  
 BLDG: 5265  
 ZONE: 5

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
7	Gen. Maint.	OCCUPANCY																								
		LIGHTING	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.4	0.8	1	1	0.1	0.1							
		PROCESS							0.3	0.6	0.6	0.6	0.3	0.2	0.3	0.6	0.5	0.2	0.1							



**E M C Engineers, Inc.**  
 PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204-000  
 DATE: 11-Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265Z6  
 BLDG: 5265  
 ZONE: 6

### Rates of Heat Gain from Occupants of Conditioned Spaces

Zone No.	No. of People	Activity Type	Degree of Activity	Typical Application	Sensible (BTU/H)	Latent (BTU/H)	TOT Sen. (BTU/H)	TOT Lat (BTU/H)
6	36	4	Seated, light work, typing	Offices, hotels, apts	250	200	9,000	7,200
TOTAL	36					TOTAL	9,000	7,200

### Peak Wattage Value for Lights

Zone No.	No. of Fixtures	Fixture Type	Description	Watts/Fixture	Total Wattage
6	20	6	Fluorescent, 2 - 34w lamps, 16w ballast (2x4 ft. fixture)	84	1,680
	309	8	Fluorescent, 4 - 34w lamps, 2 - 16w ballasts (2x4 ft. fix.)	168	51,912
	4	57	HPS - Mogul Base, 250w with 55w ballast	305	1,220
	2	19	Incandescent - 75w	75	150
	2	61	Exit Light	20	40
	8	5	Fluorescent, 1 - 34w lamp, 16w ballast (1x4 ft. fixture)	50	400
TOTAL	345			TOTAL	55,402

### Peak Value for Internal Gains

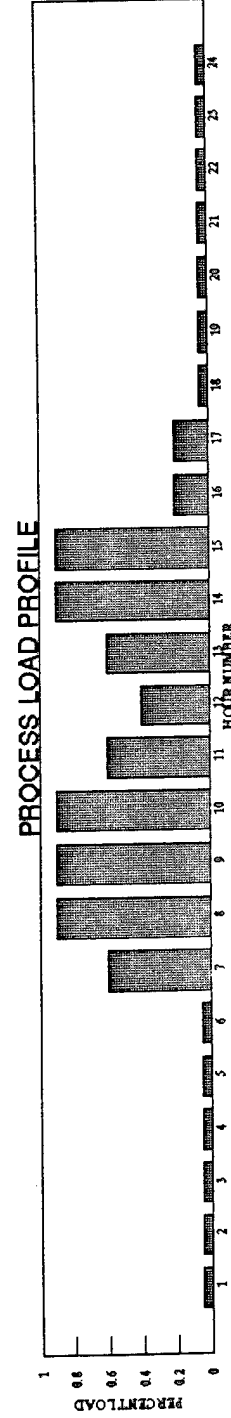
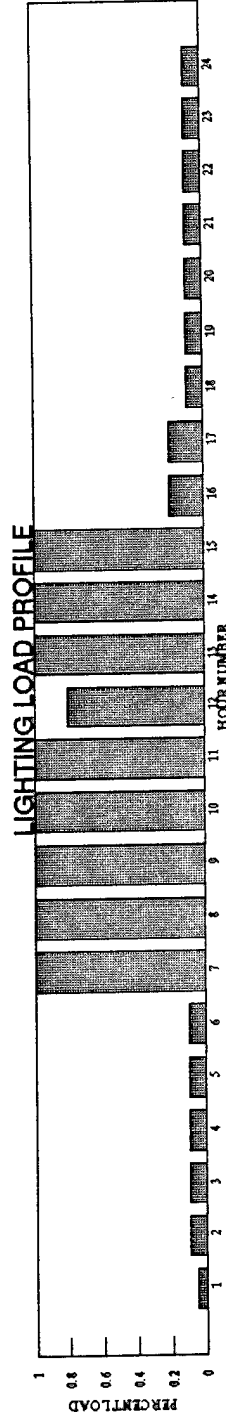
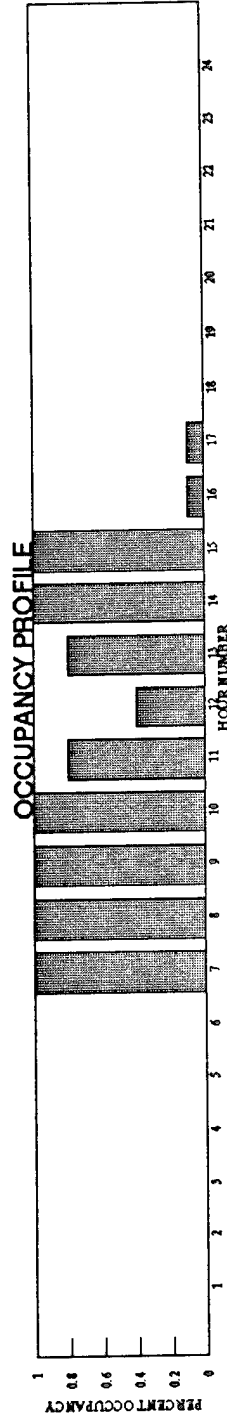
Zone No.	No. of Equipmen	Equip. Type	Description	Average Wattage	Heat Gain to Space (%)	Total Wattage	Total (BTU)
6	15	3	Microcomputer	350	91%	5,250	17,918
	15	5	Printer (laser)	870	34%	13,050	44,540
	4	45	Micro Fiche Machine	250	50%	1,000	3,413
	2	31	Fan (Circulating)	88	20%	176	601
	4	12	Typewriter	100	10%	400	1,365
	4	46	Microwave Oven	600	65%	2,400	8,191
	4	49	Radio	71	10%	284	969
	4	24	Coffee Maker	1,500	30%	6,000	20,478
	4	53	Refrigerator (12 cu. ft.)	241	20%	964	3,290
	2	54	Coke Machine	321	35%	642	2,191
	3	62	Television (Color, tube)	300	15%	900	3,072
	1	10	Copier	1,570	20%	1,570	5,358
	16	58	Sewing Machine	75	20%	1,200	4,096
				TOTAL	42%	33,836	115,482

# **E M C Engineers, Inc.**

PROJECT: EEAP, EMCS EXPANSION FEASIBILITY STUDY  
 CLIENT CONTRACT NO.: DACA 41 -92 -C-0098  
 CLIENT PROJ. ENG: DOUG CAGE  
 LOCATION: FT. LEONARD WOOD

EMC NO.: 3204 -000  
 DATE: 11 -Feb-93  
 PREPARED BY: T.M.B.  
 CHECKED BY: CEL  
 FILE: 5265Z6  
 BLDG: 5265  
 ZONE: 6

BLDG TYPE	BLDG FUNCTION	TYPE OF PROFILE	HOUR NUMBER																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3	Administration / Repair	OCCUPANCY	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	0.8	0.4	0.8	1	1	0.1	0.1							
		PROCESS	0.05	0.05	0.05	0.05	0.05	0.05	0.6	0.9	0.9	0.9	0.6	0.4	0.6	0.9	0.9	0.2	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05



## 01 Card - Job Information

-----  
 Project: EEAP STUDY, EXPANSION OF EMCS  
 Location: FT. LEONARD WOOD, MO  
 Client: US ARMY  
 Program User: E M C ENGINEERS, INC.

-----CARD 08-- Climatic Information -----  

	Summer	Winter	Summer	Summer	Winter		Summer	Winter
Weather	Clearness	Clearness	Design	Design	Design	Building	Ground	Ground
Code	Number	Number	Dry Bulb	Wet Bulb	Dry Bulb	Orientation	Reflect	Reflect
SPRINGFM	.97	.97	94	78	3			

-----CARD 09-- Load Simulation Periods-----  

1st Month	Last Month	Peak	1st Month	Last Month	1st Month	Last Month
Cooling	Cooling	Cooling	Summer	Summer	Daylight	Daylight
Simulation	Simulation	Load Hr	Period	Period	Savings	Savings
MAY	SEP		JUN	SEP	APR	OCT

-----CARD 10 -- Load Simulation Parameters-----  

Cooling	Heating		Airflow	Airflow	Room	Put Wall
Load	Load	Ventilation	Input	Output	Circulation	RA Load
Method	Method	Method	Units	Units	Rate	to Room
TETD-TA1	TETD-TA1	OADB	ACTUAL	ACTUAL	MED-RCR	NO

-----CARD 11-- Energy Simulation Parameters-----  

1st Month	Last Month	Level			Building
Energy	Energy	Of	Holiday	Calendar	Floor
Simulation	Simulation	Calculation	Code	Code	Area
JAN	DEC	ROOM	1978	1978	198876

-----CARD 13-- Daylighting Parameters -----  
 -----Atmospheric-----  
 ---Moisture--- ---Turbidity--- ---Inside Visible Reflectivity--- Daylighting  

Summer	Winter	Summer	Winter	Floor	Ceiling	Wall	Partition	Geometry
		.07	.07					

## ----- Load Section Alternative #1 -----

## ---- Load Alternative ----

Number	Description
1	BLDG 5265 BASERUN FT LEONARD WOOD

## -----CARD 20-- General Room Parameters -----

Room Number	Zone	Reference Number	Room Descrip	Floor Length	Floor Width	Const Type	Plenum Height	Acoustic Ceiling Resistance	Floor to Floor Height	Duplicate Floors Multiplier	Duplicate Rooms per Zone	Perimeter Depth
1		1	GEN MAINT BAYS	802.292	24	8	0		27.1			
2		2	GEN MAINT SHOP	1000	65.268	8	0		28			
3		3	GEN MAINT ADMIN	70.267	60	8	0		10			
4		4	GEN MAINT BAYS	355	24	8	0		28			
5		5	GEN MAINT SHOP	1000	75.06	8	0		24.6			
6		6	GEN MAINT ADMIN	1000	26.557	8	0		18.6			

## -----CARD 21-- Thermostat Parameters -----

Room Number	Cooling Room Design DB	Room RH	Cooling T'stat Driftpoint	Cooling T'stat Schedule	Heating Room Design DB	Heating T'stat Driftpoint	Heating T'stat Schedule	Heating T'stat Location Flag	T'stat Location	Mass / No. Hrs	Carpet On
M	72			CLG72SUM	70			HTG70WNT	ROOM	LIGHT10	NO
1											
2											
3					72			HTG72WNT			
4											
5											
6					72			HTG72WNT			

## -----CARD 22-- Roof Parameters -----

Room Number	Roof Number	Equal to Floor?	Roof Length	Roof Width	Roof U-Value	Const Type	Roof Direction	Roof Tilt	Roof Alpha
1	1	NO	1000	19.923	.069	20			.45
2	1	NO	1000	64.8	.069	20			.45
4	1	YES			.069	20			.45
5	1	NO	1000	73.017	.069	20			.45
6	1	NO	1000	24.109	.069	20			.45

## -----CARD 24-- Wall Parameters -----

Room Number	Wall Number	Wall Length	Wall Height	Wall U-Value	Wall Constuc Type	Wall Direction	Wall Tilt	Wall Alpha	Ground Reflectance Multiplier
M	1				71			.45	

## -----CARD 24-- Wall Parameters -----

Room Number	Wall Number	Wall Length	Wall Height	Wall U-Value	Wall	Wall Direction	Wall Tilt	Wall Alpha	Ground
					Constuc Type				Reflectance Multiplier
1	1	100	56	.16		0			
1	2	100	86.35	.364		90			
1	3	1000	11.145	.335		270			
2	1	100	12.32	.115		0			
2	2	39	10	.203		270			
3	1	100	8.41	.102		270			
4	1	100	99.4	.376		180			
4	2	67.2	10	.245		90			
4	3	67.2	10	.115		270			
5	1	100	52.36	.118		0			
5	2	100	75.13	.228		180			
5	3	100	43.75	.211		90			
5	4	100	29.12	.2		270			
6	1	100	55.38	.166		0			
6	2	75	10	.102		180			
6	3	100	10.92	.117		90			

## -----CARD 25-- Wall/Glass Parameters -----

Room Number	Wall Number	Glass Length	Glass Width	Pct Glass		Shading Coefficient	External	Internal	Percent	Visible Transmittance	Inside
				or No. of Windows	Glass U-Value		Shading Type	Shading Type	Solar to Ret. Air		Visible Reflectance
M	1			1	.568	.58				.2	
1	1	100	12.27								
1	2	100	10.27								
1	3	100	12								
2	1	29.3	10								
3	1	12	10								
4	1	100	10								
4	2	12	10								
4	3	16	10								
5	1	100	12.47								
5	2	100	16.87								
5	3	99.1	10								
5	4	58.7	10								
6	1	31.5	10								
6	2	14.5	10								
6	3	10.8	10								

## -----CARD 26-- Schedules -----

Room Number	People	Lights	Ventilation	Infiltration	Reheat Minimum	Cooling Fans	Heating Fan	Auxiliary Fan	Room Exhaust	Daylighting Controls
M	FLW-P716	FLW-L716	AVAIL	AVAIL		AVAIL	AVAIL			
1						OFF	FLWFANWT			



## -----CARD 26-- Schedules -----

Room	Reheat	Cooling	Heating	Auxiliary	Room	Daylighting				
Number	People	Lights	Ventilation	Infiltration	Minimum	Fans	Fan	Fan	Exhaust	Controls
2										
3										
4						OFF	FLWFANWT			
5										
6										

## -----CARD 27-- People and Lights -----

Room	People	People	People	People	Lighting	Lighting	Lighting	Ballast	Percent	--- Daylighting ---
Number	Value	Units	Sensible	Latent	Value	Units	Fixture	Factor	Lights to	Reference
M		PEOPLE	275	475		WATTS	Type		Ret. Air	Point 1
1	10				11520		INCAND			1
2	80				32532		INCAND			1
3	15				6216		SUSFLUOR			
4	10				4390		INCAND			
5	50				62244		INCAND			
6	36				55402		SUSFLUOR			

## -----CARD 28-- Miscellaneous Equipment -----

Room	Misc	Energy	Energy	Energy	Percent	Percent	Percent	Percent	Percent	Percent
Number	Equipment	Equipment	Consump	Consump	Schedule	Meter	of Load	Misc. Load	Misc. Sens	Radiant
M	Number	Descrip	Value	Units	Code	Code	Sensible	to Room	to Ret. Air	Fraction
1	1	PROCESS		WATTS	FLW1E716	ELEC	100			
2	1		22380						8	
3	1		112242					17		
4	1		13632		FLW2E716			45		
5	1		15666					9		
6	1		85381					10		
7	1		33836		FLW2E716			42		

## -----CARD 29-- Room Airflows -----

Room	-----Ventilation-----	-----Infiltration-----	-----Reheat Minimum-----
Number	Value	Units	Value
M		CFM	
1			17419
2	0		214
3	10	PCT-MCLG	97
4			7952
5			2398
6	2370	CFM	1032

## -----CARD 30- Fan Airflows -----

Room Number	-----Cooling-----		-----Heating-----		-----Cooling-----		-----Heating-----		--Room Exhaust--	
	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
1	79100	CFM	79100	CFM						
2	83900	CFM	83900	CFM						
3	8080	CFM	8080	CFM						
4	59261	CFM	59261	CFM						
5	83550	CFM	83550	CFM						
6	23700	CFM	18930	CFM						

## -----CARD 31-- Partition Parameters -----

Room Number	Partition Number	Partition Length	Partition Height	Partition U-Value	Const Type	Temp Flag	Cooling Temp	Heating Temp	Adjacent Room No
M	1				109	CONSTANT			
1	1	103	10						
2	1	1000	10.08						
3	1	15	10						
4	1	15	10						
5	1	1000	13.536						
6	1	1000	10.8						

## -----CARD 32-- Exposed Floor Parameters -----

Room Number	Exposed Floor Number	-----Slab-----		Floor Area	Floor U-Value	-----Exposed Floor-----				Adjacent Room No
		Perimeter Length	Loss Coefficient			Const Type	Temp Flag	Cooling Temp	Heating Temp	
1	1	936	.66							
2	1	64	.66							
3	1	84	.66							
4	1	403	.66							
5	1	784	.66							
6	1	415	.66							

## ----- System Section Alternative #1 -----

## -----CARD 39-- System Alternative -----

Number	Description
1	BLDG 5265 BASERUN FT LEONARD WOOD

## -----CARD 40-- System Type -----

-----OPTIONAL VENTILATION SYSTEM-----							
System Set	System	Ventil Deck	Cooling	Heating	Cooling	Heating	Fan Static
Number	Type	Location	SADEVh	SADEVh	Schedule	Schedule	Pressure
1	UH						



## -----CARD 44-- System Options -----

System	Econ	Econ	Max Pct	Direct	Indirect	1st Stage	----- Exhaust Air Heat Recovery -----			
Set	Type	On	Outside	Evap	Evap	Evap	Fan	--- Effectiveness ---	--- Control Method ---	
Number	Flag	Point	Air	Cooling	Cooling	Cooling	Cycling	System	Room	System
2										
3	DRY-BULB	65	100							
4	DRY-BULB	65	100							

## -----CARD 45-- Equipment Schedules -----

System	Main	Direct	Indirect	Auxiliary	Main	Main	Auxiliary		
Set	Cooling	Evap	Evap	Cooling	Heating	Preheat	Reheat	Mech.	Heating
Number	Coil	Economizer	Coil	Coil	Coil	Coil	Coil	Humidity	Coil
1	OFF	OFF			AVAIL				
2	OFF	OFF			AVAIL	OFF			
3	AVAIL	AVAIL			AVAIL	OFF			
4	AVAIL	AVAIL			AVAIL	OFF	AVAIL		

## -----CARD 48-- Cooling Capacity Overrides -----

System	Misc			-----MAIN COOLING-----				---AUX COOLING---	
Set	People	Lights	Loads	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Variance	Variance	Variance	Value	Units	Sizing	Location	Value	Units
1				0	MBH				
2				0	MBH				
3				207.3	MBH				
4				607.9	MBH				

## -----CARD 49-- Heating Capacity Overrides -----

System	---MAIN HEATING---		---PREHEAT---		---REHEAT---		---HUMIDIFICATION---		---AUX HEATING---	
Set	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity
Number	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
1	3766.2	MBH								
2	7799.6	MBH	0	MBH						
3	96.7	MBH	0	MBH						
4	363.3	MBH	0	MBH						

## ----- Equipment Section Alternative #1 -----

## -----CARD 59-- Equipment Description / TOD Schedules -----

		Elec Consump	Elec Demand	Demand		
Alternative	Time of Day	Time of Day	Limit			
Number	Schedule	Schedule	Max KW	Alternative Description		
1				BLDG 5265	BASERUN	FT LEONARD WOOD

```

-----CARD 60--- Cooling Load Assignment-----
Load All Coil Cooling
Asgn Loads To Equipment -Group 1- -Group 2- -Group 3- -Group 4- -Group 5- -Group 6- -Group 7- -Group 8- -Group 9-
Ref Cool Ref Sizing Begin End Begin End Begin End Begin End Begin End Begin End Begin End Begin End
1 1 3 4

```

```

-----CARD 62-- Cooling Equipment Parameters -----
Cool Equip Num -----COOLING----- -----HEAT RECOVERY----- Seq Demand
Ref Code Of --Capacity-- --Energy-- --Capacity-- --Energy-- Order Seq Limit
Num Name Units Value Units Value Units Value Units Value Units Num Type Number
1 EQ10018 1

```

```

-----CARD 63-- Cooling Pumps and References -----
Cool ---CHILLED WATER--- ---CONDENSER--- ---HT REC or AUX--- Switch-
Ref Full Load Full Load Full Load Full Load Full Load Full Load Full Load over Cold Cooling Misc.
Num Value Units Value Units Value Units Control Storage Tower Access.
1 3.544 KW 3.73 KW

```

```

-----CARD 65-- Heating Load Assignment -----
Load All Coil
Assignment Loads To -Group 1- -Group 2- -Group 3- -Group 4- -Group 5- -Group 6- -Group 7- -Group 8- -Group 9-
Reference Heating Ref Begin End Begin End Begin End Begin End Begin End Begin End Begin End Begin End
1 1 1 4

```

```

-----CARD 67-- Heating Equipment Parameters -----
Heat Equip Number HW Pmp Energy Seq Switch Demand
Ref Code Of Full Ld Cap'y Rate Order over Hot Misc. Limit
Number Name Units Value Units Value Units Value Units Number Control Strg Acc. Cogen Number
1 EQ2002 1 8.579 KW MBH 80 PCTEFF

```

```

-----CARD 69-- Fan Equipment Parameters -----
System
Set Cooling Heating Return Exhaust Auxiliary Room Optional
Number Fan Fan Fan Fan Supply Exhaust Ventilation
1 EQ4371
2 EQ4372
3 EQ4002
4 EQ4002 EQ4003

```

## -----CARD 70-- Fan Equipment KW Overrides -----

-----MAIN SYSTEM-----			--OTHER SYSTEM--			-----DEMAND LIMIT PRIORITY----						
System	Cool	Heat	Ret	Exh	Aux	Room	Opt		Room	Opt		
Set	Fan	Fan	Fan	Fan	Sup	Exh	Vent	Cool	Heat	Aux	Exh	Vent
Number	KW	KW	KW	KW	KW	KW	KW	Fan	Fan	Fan	Fan	Fan
1	5.968											
2	73.108											
3	3.544											
4	16.9729.427											

## ----- Load Section Alternative #2 -----

## ---- Load Alternative ----

Number	Description
2	BLDG 5265 NIGHT SETBACK FT LEONARD WOOD

## -----CARD 20-- General Room Parameters -----

Zone		Acoustic		Floor to		Duplicate		Duplicate		Perimeter	
Room	Reference	Room	Floor	Floor	Const	Plenum	Ceiling	Floor	Floors	Rooms per	Depth
Number	Number	Descrip	Length	Width	Type	Height	Resistance	Height	Multiplier	Zone	
1	1	GEN MAINT BAYS	802.292	24	8	0		27.1			
2	2	GEN MAINT SHOP	1000	65.268	8	0		28			
3	3	GEN MAINT ADMIN	70.267	60	8	0		10			
4	4	GEN MAINT BAYS	355	24	8	0		28			
5	5	GEN MAINT SHOP	1000	75.06	8	0		24.6			
6	6	GEN MAINT ADMIN	1000	26.557	8	0		18.6			

## -----CARD 21-- Thermostat Parameters -----

Cooling		Room		Cooling		Heating		Heating		Heating		T'stat		Mass /		Carpet	
Room	Room	Design	T'stat	T'stat	Room	T'stat	T'stat	T'stat	Location	No. Hrs	On						
Number	Design	DB	RR	Driftpoint	Schedule	Design	DB	Driftpoint	Schedule	Flag	Average	Floor					
M	72				CSB72SUM	70			HSB70WNT	ROOM	LIGHT10	NO					
1																	
2																	
3						72			HSB72WNT								
4																	
5																	
6						72			HSB72WNT								

## -----CARD 22-- Roof Parameters -----

Roof		Roof		Roof		Roof		Roof		Roof	
Room	Roof	Equal to	Roof	Roof	Roof	Const	Roof	Roof	Roof	Roof	Roof
Number	Number	Floor?	Length	Width	U-Value	Type	Direction	Tilt	Alpha		
1	1	NO	1000	19.923	.069	20			.45		
2	1	NO	1000	64.8	.069	20			.45		



## Utility Description Reference Table

## Schedules:

AVAIL AVAILABLE (100%)  
CDDC78SM CLG DDC T-STAT AT 78 (MAY THRU SEPT)  
CLG72SUM COOLING TSTAT AT 72 (MAY TO SEPT)  
CSB72SUM COOLING SB TSTAT AT 72 (MAY THRU SEPT)  
FLW-L716 LIGHTING SCHEDULE - 0700 TO 1600  
FLW-P716 PEOPLE SCHEDULE - 0700 TO 1600  
FLW1E716 EQUIP. SCHED.-0700 TO 1600 (NO NITE LOAD)  
FLW2E716 EQUIP. SCHED.-0700 TO 1600 (5% NITE LOAD)  
FLWFANWT FAN SCHEDULE - OCT THRU APR  
HDDC68WT HEATING DDC T-STAT AT 68 (OCT TO APR)  
HSB70WNT HEATING SB T-STAT AT 70 (OCT TO APR)  
HSB72WNT HEATING SB T-STAT AT 72 (OCT TO APR)  
HTG70WNT HEATING T-STAT AT 70 (OCT TO APR)  
HTG72WNT HEATING T-STAT AT 72 (OCT TO APR)  
OFF ALWAYS OFF

## System:

SZ SINGLE ZONE  
TABVAV TERMINAL AIR BLENDER VAV  
UH UNIT HEATERS  
UV UNIT VENTILATOR

## Equipment:

## Cooling:

EQ1001S 2-STG CTV <555 TONS

## Heating:

EQ2002 GAS FIRE TUBE STEAM

## Fan:

EQ4002 BI CENTRIF. FAN C.V.  
EQ4003 FC CENTRIF. FAN C.V.  
EQ4371 FAN COIL SUPPLY FAN  
EQ4372 UNIT VENTILATOR FAN



Schedule Name: AVAIL  
Project: AVAILABLE (100)  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: BTG  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util Percent
0	100
24	

Schedule Name: CDDC78SM

Project: CLG DDC T-STAT AT 78 (MAY THRU

Location:

Client:

Program User:

Comments: CLG DDC T-STAT AT 78 (MAY THRU

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	100
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	90
6	78
19	90
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	100
24	

Schedule Name: CLG72SUM

Project: COOLING TSTAT SCHEDULE - 72

Location:

Client:

Program User:

Comments: COOLING T-STAT - SET AT 72 (MA

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 72  
24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----  
0 100  
24

Schedule Name: CSB72SUM

Project: COOLING SB TSTAT AT 72 (MAY TH

Location:

Client:

Program User:

Comments: COOLING SB TSTAT AT 72 (MAY TH

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	100
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	90
6	72
19	90
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	100
24	

Schedule Name: FLW-L716  
Project: LIGHTING SCHEDULE  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: LIGHTING SCHEDULE - 0700 TO 16

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

-----  
0 10  
7 100  
16 20  
18 10  
24

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent

-----  
0 10  
24

Schedule Name: FLW-P716  
Project: PEOPLE SCHEDULE  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: PEOPLE SCHEDULE - 0700 TO 1600

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent  
-----

0	0
7	100
11	80
12	40
13	80
14	100
16	10
18	0
24	

Schedule Name: FLW1E716  
Project: EQUIPMENT SCHEDULE  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - 0700 TO 1

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent

Hour	Util Percent
0	0
7	30
8	60
11	30
12	20
13	30
14	60
15	50
16	20
17	10
18	0
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour Util Percent

Hour	Util Percent
0	-1
24	

Schedule Name: FLW2E716  
Project: EQUIPMENT SCHEDULE  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: EQUIPMENT SCHEDULE - 0700 TO 1

Starting Month: JAN Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: WKDY

Hour Util Percent  
-----

0	5
7	30
8	60
11	30
12	20
13	30
14	60
15	50
16	20
17	10
18	5
24	

Starting Month: JAN Ending Month: DEC  
Starting Day Type: SAT Ending Day Type: SUN

Hour Util Percent  
-----

0	5
24	



Schedule Name: FLWFANWT  
Project: FAN SCHEDULE - OCT THRU APR  
Location: FT LEONARD WOOD, MO  
Client: US ARMY  
Program User: EMC ENGINEERS, INC.  
Comments: FAN SCHEDULE - OCT THRU APR

Starting Month: JAN Ending Month: APR  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0	100	
24		

Starting Month: MAY Ending Month: SEP  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0	0	
24		

Starting Month: OCT Ending Month: DEC  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0	100	
24		

Schedule Name: HDDC68WT

Project: HEATING DDC T-STAT AT 68 (OCT T

Location:

Client:

Program User:

Comments: HEATING DDC T-STAT AT 68 (OCT

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

Hour	Temperature
0	55
6	68
19	55
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

Hour	Temperature
0	35
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

Hour	Temperature
0	55
6	68
19	55
24	

Schedule Name: HSB70WNT

Project: HEATING SB T-STAT AT 70 (OCT TO

Location:

Client:

Program User:

Comments: HEATING SB T-STAT AT 70 (OCT T

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0	55
6	70
19	55
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0	35
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0	55
6	70
19	55
24	

Schedule Name: HSB72WNT

Project: HEATING SB T-STAT AT 72 (OCT TO

Location:

Client:

Program User:

Comments: HEATING SB T-STAT AT 72 (OCT T

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	72
19	55
24	

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	35
24	

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

0	55
6	72
19	55
24	

Schedule Name: HTG70WNT

Project: HEATING T-STAT AT 70 (OCT TO AP

Location:

Client:

Program User:

Comments: HEATING T-STAT AT 70 (OCT TO A

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 70

24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 35

24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 70

24

Schedule Name: HTG72WNT

Project: HEATING T-STAT AT 72 (OCT TO AP

Location:

Client:

Program User:

Comments: HEATING T-STAT AT 72 (OCT TO A

Starting Month: JAN Ending Month: APR

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 72

24

Starting Month: MAY Ending Month: SEP

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 35

24

Starting Month: OCT Ending Month: DEC

Starting Day Type: DSGN Ending Day Type: SUN

Hour Temperature

-----

0 72

24

Schedule Name: OFF  
Project: ALWAYS OFF  
Location:  
Client:  
Program User:  
Comments:

Starting Month: JAN Ending Month: BTG  
Starting Day Type: DSGN Ending Day Type: SUN

Hour	Util	Percent
0	0	
24		

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

EEAP STUDY, EXPANSION OF EMCS  
FT. LEONARD WOOD, MO  
US ARMY  
E M C ENGINEERS, INC.

Weather File Code:	SPRINGFM
Location:	SPRINGFIELD, MISSOURI
Latitude:	37.0 (deg)
Longitude:	93.0 (deg)
Time Zone:	6
Elevation:	1,265 (ft)
Barometric Pressure:	28.5 (in. Hg)
Summer Clearness Number:	0.97
Winter Clearness Number:	0.97
Summer Design Dry Bulb:	94 (F)
Summer Design Wet Bulb:	78 (F)
Winter Design Dry Bulb:	3 (F)
Summer Ground Relectance:	0.20
Winter Ground Relectance:	0.20
Air Density:	0.0724 (Lbm/cuft)
Air Specific Heat:	0.2444 (Btu/lbm/F)
Density-Specific Heat Prod:	1.0621 (Btu-min./hr/cuft/F)
Latent Heat Factor:	4,675.1 (Btu-min./hr/cuft)
Enthalpy Factor:	4.3449 (Lb-min./hr/cuft)
Design Simulation Period:	May To September
System Simulation Period:	January To December
Cooling Load Methodology:	TETD/Time Averaging
Time/Date Program was Run:	21:19:34 3/17/93
Dataset Name:	5265 .TM



AIRFLOW - ALTERNATIVE 1

BLDG 5265 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Airflow Quantities)

System Number	System Type	Main					Auxil.	Room
		Outside Airflow (Cfm)	Cooling Airflow (Cfm)	Heating Airflow (Cfm)	Return Airflow (Cfm)	Exhaust Airflow (Cfm)	Supply Airflow (Cfm)	Exhaust Airflow (Cfm)
1	UH	0	0	138,361	0	25,371	0	0
2	UV	104,072	0	167,450	170,062	106,684	0	0
3	SZ	808	8,080	8,080	8,177	8,080	0	0
4	TABVAV	2,370	19,450	18,930	20,482	19,450	0	0
Totals		107,250	27,530	332,821	198,721	159,585	0	0

CAPACITY - ALTERNATIVE 1

BLDG 5265 BASERUN FT LEONARD WOOD

----- S Y S T E M S U M M A R Y -----  
(Design Capacity Quantities)

		Cooling				Heating						
		Main Sys.	Aux. Sys.	Opt. Vent	Cooling	Main Sys.	Aux. Sys.	Preheat	Reheat	Humidif.	Opt. Vent	Heating
System	System	Capacity	Capacity	Capacity	Totals	Capacity	Capacity	Capacity	Capacity	Capacity	Capacity	Totals
Number	Type	(Tons)	(Tons)	(Tons)	(Tons)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(Btuh)
1	UH	0.0	0.0	0.0	0.0	-3,766,200	0	0	0	0	0	-3,766,200
2	UV	0.0	0.0	0.0	0.0	-7,799,600	0	0	0	0	0	-7,799,600
3	SZ	17.3	0.0	0.0	17.3	-96,700	0	0	0	0	0	-96,700
4	TABVAV	50.7	0.0	0.0	50.7	-363,300	0	0	0	0	0	-363,300
Totals		67.9	0.0	0.0	67.9	12,025,800	0	0	0	0	0	-12,025,800

The building peaked at hour 15 month 7 with a capacity of 59.5 tons

ENGINEERING CHECKS - ALTERNATIVE 1

BLDG 5265 BASERUN FT LEONARD WOOD

----- E N G I N E E R I N G C H E C K S -----

System Number	Main/ Auxiliary	System Type	Percent	Cooling				Heating		Floor Area Sq Ft
			Outside Air	Cfm/ Sq Ft	Cfm/ Ton	Sq Ft /Ton	Btuh/ Sq Ft	Cfm/ Sq Ft	Btuh/ Sq Ft	
1	Main	UH	0.00	0.00	0.0	0.0	0.00	4.98	-135.60	27,775
2	Main	UV	62.15	0.00	0.0	0.0	0.00	1.19	-55.58	140,328
3	Main	SZ	10.00	1.92	467.7	244.1	49.17	1.92	-22.94	4,216
4	Main	TABVAV	12.19	0.73	383.9	524.2	22.89	0.71	-13.68	26,557

System 1 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 3

	Space	Ret. Air	Ret. Air	Net	Perct	*	Space	Perct	*	Space Peak	Coil Peak	Perct
	Sens.+Lat. (Btuh)	Sensible (Btuh)	Latent (Btuh)	Total (Btuh)	Of Tot (%)		Sensible (Btuh)	Of Tot (%)		Space Sens (Btuh)	Tot Sens (Btuh)	Of Tot (%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	-131,492	-131,492	4.57
Glass Solar	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Cond	0	0		0	0.00	*	0	0.00	*	-189,031	-189,031	6.57
Wall Cond	0	0		0	0.00	*	0	0.00	*	-693,860	-693,860	24.10
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	-59,211	-59,211	2.06
Infiltration	0			0	0.00	*	0	0.00	*	-1,805,369	-1,805,369	62.71
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-2,878,963	-2,878,963	100.00
Internal Loads												
Lights	0	0		0	0.00	*	0	0.00	*	0	0	0.00
People	0			0	0.00	*	0	0.00	*	0	0	0.00
Misc	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	0	0.00
Sup. Fan Heat				0	0.00	*		0.00	*		0	0.00
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Pkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0	0	0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-2,878,963	-2,878,963	100.00

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	27,775
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	1,180
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	1,339
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Roof	28,443
Totals	0.0	0.0									Wall	36,664
												4,734
												13

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	0	Clg Cfm/Sqft	0.00	SADB	0.0	89.6
Main Htg	-3,766.2	138,361	64.0	89.6	Infil	0	25,371	Clg Cfm/Ton	0.00	Plenum	0.0	70.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	138,361	Clg Sqft/Ton	0.00	Return	0.0	70.0
Preheat	0.0	0	0.0	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	70.0
Reheat	0.0	0	0.0	0.0	Return	0	138,361	No. People	0	Runarnd	0.0	70.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	0	Htg % OA	0.0	Fn MtrTD	0.1	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/SqFt	4.98	Fn BldTD	0.1	0.0
Total	-3,766.2				Auxil	0	0	Htg Btuh/SqFt	-135.60	Fn Frict	0.2	0.0

System 2 Block UV - UNIT VENTILATOR

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==>	Mo/Hr: 0/ 0					*	Mo/Hr: 0/ 0					*	Mo/Hr: 13/ 1				
Outside Air ==>	OADB/WB/HR: 0/ 0/ 0.0					*	OADB: 0					*	OADB: 3				
						*						*					
	Space	Ret. Air	Ret. Air	Net	Percnt	*	Space	Percnt	*	Space	Peak	Coil	Peak	Percnt			
	Sens.+Lat.	Sensible	Latent	Total	Of Tot	*	Sensible	Of Tot	*	Space	Peak	Coil	Peak	Percnt			
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)	*	(Btuh)	(%)	*	Space	Peak	Coil	Peak	Percnt			
Envelope Loads						*			*								
Skylite Solr	0	0		0	0.00	*	0	0.00	*		0	0	0	0.00			
Skylite Cond	0	0		0	0.00	*	0	0.00	*		0	0	0	0.00			
Roof Cond	0	0		0	0.00	*	0	0.00	*	-637,128	-637,128			7.42			
Glass Solar	0	0		0	0.00	*	0	0.00	*		0	0	0	0.00			
Glass Cond	0	0		0	0.00	*	0	0.00	*	-192,021	-192,021			2.24			
Wall Cond	0	0		0	0.00	*	0	0.00	*	-212,016	-212,016			2.47			
Partition	0			0	0.00	*	0	0.00	*	0	0	0	0	0.00			
Exposed Floor	0			0	0.00	*	0	0.00	*	-37,499	-37,499			0.44			
Infiltration	0			0	0.00	*	0	0.00	*	-185,867	-185,867			2.16			
Sub Total==>	0	0		0	0.00	*	0	0.00	*	-1,264,531	-1,264,531			14.72			
Internal Loads						*			*								
Lights	0	0		0	0.00	*	0	0.00	*		0	0	0	0.00			
People	0			0	0.00	*	0	0.00	*		0	0	0	0.00			
Misc	0	0	0	0	0.00	*	0	0.00	*		0	0	0	0.00			
Sub Total==>	0	0	0	0	0.00	*	0	0.00	*		0	0	0	0.00			
Ceiling Load	0	0		0	0.00	*	0	0.00	*								
Outside Air	0	0	0	0	0.00	*	0	0.00	*	0	-7,405,637			86.21			
Sup. Fan Heat				0	0.00	*		0.00	*			80,376		-0.94			
Ret. Fan Heat		0		0	0.00	*		0.00	*			0	0	0.00			
Duct Heat Pkup		0		0	0.00	*		0.00	*			0	0	0.00			
OV/UNDR Sizing	0			0	0.00	*	0	0.00	*	0		0	0	0.00			
Exhaust Heat		0	0	0	0.00	*		0.00	*			0	0	0.00			
Terminal Bypass		0	0	0	0.00	*		0.00	*			0	0	0.00			
						*			*								
Grand Total==>	0	0	0	0	0.00	*	0	0.00	*	-1,264,531	-8,589,792			100.00			

-----COOLING COIL SELECTION-----										-----AREAS-----		
Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)	
(Tons)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains	Floor	140,328		
Main Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	Part	23,616		
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	ExFlr	848		
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	Roof	137,817	0	0
Totals	0.0	0.0							Wall	21,658	4,809	22

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----			--ENGINEERING CHECKS--		--TEMPERATURES (F)---		
	Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA	0.0	Type	Clg	Htg
	(Mbh)	(cfm)	Deg F	Deg F	Vent	0	104,072	Clg Cfm/Sqft	0.00	SADB	0.0	77.1
Main Htg	-7,799.6	167,450	33.3	77.1	Infil	0	2,612	Clg Cfm/Ton	0.00	Plenum	0.0	70.0
Aux Htg	0.0	0	0.0	0.0	Supply	0	167,450	Clg Sqft/Ton	0.00	Return	0.0	70.0
Preheat	-0.0	167,450	28.8	0.0	Mincfm	0	0	Clg Btuh/Sqft	0.00	Ret/OA	0.0	28.4
Reheat	0.0	0	0.0	0.0	Return	0	167,450	No. People	0	Runarnd	0.0	70.0
Humidif	0.0	0	0.0	0.0	Exhaust	0	104,072	Htg % OA	62.2	Fn MtrTD	0.2	0.0
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg Cfm/Sqft	1.19	Fn BldTD	0.1	0.0
Total	-7,799.6				Auxil	0	0	Htg Btuh/Sqft	-55.58	Fn Frict	0.3	0.0

System 3 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
Peaked at Time ==> Mo/Hr: 7/15 \* Mo/Hr: 7/15 \* Mo/Hr: 13/ 1  
Outside Air ==> OADB/WB/HR: 94/ 78/124.0 \* OADB: 94 \* OADB: 3

	Space	Ret. Air	Ret. Air	Net	Percent		Space	Percent		Space Peak	Coil Peak	Percent
	Sens.+Lat.	Sensible	Latent	Total	Of Tot		Sensible	Of Tot		Space Sens	Tot Sens	Of Tot
	(Btuh)	(Btuh)	(Btuh)	(Btuh)	(%)		(Btuh)	(%)		(Btuh)	(Btuh)	(%)
Envelope Loads												
Skylite Solr	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Skylite Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Roof Cond	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Glass Solar	8,520	0		8,520	8.05	*	8,520	16.01	*	0	0	0.00
Glass Cond	1,486	0		1,486	1.40	*	1,486	2.79	*	-4,935	-4,935	6.48
Wall Cond	3,265	0		3,265	3.09	*	3,265	6.14	*	-5,074	-5,074	6.67
Partition	0			0	0.00	*	0	0.00	*	0	0	0.00
Exposed Floor	0			0	0.00	*	0	0.00	*	-3,825	-3,825	5.02
Infiltration	4,683			4,683	4.43	*	2,266	4.26	*	-7,108	-7,108	9.34
Sub Total==>	17,954	0		17,954	16.97	*	15,538	29.20	*	-20,943	-20,943	27.51
Internal Loads												
Lights	21,215	0		21,215	20.06	*	21,215	39.87	*	0	0	0.00
People	11,250			11,250	10.64	*	4,125	7.75	*	0	0	0.00
Misc	11,725	0	0	11,725	11.08	*	11,725	22.04	*	0	0	0.00
Sub Total==>	44,190	0	0	44,190	41.78	*	37,065	69.66	*	0	0	0.00
Ceiling Load	0	0		0	0.00	*	0	0.00	*	0	0	0.00
Outside Air	0	0	0	39,006	36.88	*	0	0.00	*	0	-59,213	77.77
Sup. Fan Heat				4,022	3.80	*		0.00	*		4,022	-5.28
Ret. Fan Heat		0		0	0.00	*		0.00	*		0	0.00
Duct Heat Fkup		0		0	0.00	*		0.00	*		0	0.00
OV/UNDR Sizing	603			603	0.57	*	603	1.13	*	0	0	-0.00
Exhaust Heat		0	0	0	0.00	*		0.00	*		0	0.00
Terminal Bypass		0	0	0	0.00	*		0.00	*		0	0.00
Grand Total==>	62,747	0	0	105,774	100.00	*	53,206	100.00	*	-20,943	-76,134	100.00

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity	Sens Cap.	Coil Airfl	Entering DB/WB/HR			Leaving DB/WB/HR			Gross Total	Glass (sf)	(%)
	(Tons)	(Mbh)	(Mbh)	(cfm)	Deg F	Deg F	Grains	Deg F	Deg F	Grains		
Main Clg	17.3	207.3	149.2	8,080	74.2	66.5	90.5	65.3	58.6	66.6	Floor	4,216
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	150
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	84
Totals	17.3	207.3									Roof	0
											Wall	841
												120
												14

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----					-----ENGINEERING CHECKS-----		-----TEMPERATURES (F)-----		
Capacity	Coil Airfl	Ent	Lvg	Type	Cooling	Heating	Clg % OA			Clg % OA		Type	Clg	Htg
(Mbh)	(cfm)	Deg F	Deg F	Vent										
Main Htg	-96.7	8,080	62.7	74.0	Infil	97	97	Clg Cfm/Sqft	1.92	SADB	65.8	74.4		
Aux Htg	0.0	0	0.0	0.0	Supply	8,080	8,080	Clg Cfm/Ton	467.73	Plenum	72.0	72.0		
Preheat	-0.0	8,080	65.1	65.3	Mincfm	0	0	Clg Sqft/Ton	244.05	Return	72.0	72.0		
Reheat	0.0	0	0.0	0.0	Return	8,080	8,080	Clg Btuh/Sqft	49.17	Ret/OA	74.2	65.1		
Humidif	0.0	0	0.0	0.0	Exhaust	808	808	No. People	15	Runarnd	72.0	72.0		
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	10.0	Fn MtrTD	0.1	0.0		
Total	-96.7				Auxil	0	0	Htg Cfm/SqFt	1.92	Fn BldTD	0.1	0.0		
								Htg Btuh/SqFt	-22.94	Fn Frict	0.3	0.0		

System 4 Block TABVAV - TERMINAL AIR BLENDER VAV

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

COOLING COIL PEAK					CLG SPACE PEAK					HEATING COIL PEAK				
Peaked at Time ==>					Mo/Hr: 7/15					Mo/Hr: 13/ 1				
Outside Air ==>					OADB/WB/HR: 94/ 78/124.0					OADB: 3				
Envelope Loads	Space Sens.+Lat. (Btuh)	Ret. Air Sensible (Btuh)	Ret. Air Latent (Btuh)	Net Total (Btuh)	Percent Of Tot (%)	Space Sensible (Btuh)	Percent Of Tot (%)	Space Peak (Btuh)	Coil Peak (Btuh)	Percent Of Tot (%)	Space Sens (Btuh)	Coil Peak (Btuh)	Percent Of Tot (%)	
Skylite Solr	0	0	0	0	0.00	0	0.00	0	0	0.00	0	0	0.00	
Skylite Cond	0	0	0	0	0.00	0	0.00	0	0	0.00	0	0	0.00	
Roof Cond	64,378	0	0	64,378	10.59	64,378	17.54	-114,783	-114,783	41.12	0	0	0.00	
Glass Solar	14,768	0	0	14,768	2.43	14,768	4.02	0	0	0.00	0	0	0.00	
Glass Cond	7,033	0	0	7,033	1.16	7,033	1.92	-23,358	-23,358	8.37	0	0	0.00	
Wall Cond	30,063	0	0	30,063	4.95	30,063	8.19	-72,026	-72,026	25.80	0	0	0.00	
Partition	0	0	0	0	0.00	0	0.00	0	0	0.00	0	0	0.00	
Exposed Floor	0	0	0	0	0.00	0	0.00	-18,899	-18,899	6.77	0	0	0.00	
Infiltration	67,202	0	0	67,202	11.06	24,113	6.57	-75,628	-75,628	27.10	0	0	0.00	
Sub Total==>	183,444	0	0	183,444	30.18	140,356	38.25	-304,694	-304,694	109.16	0	0	0.00	
Internal Loads														
Lights	189,087	0	0	189,087	31.11	189,087	51.52	0	0	0.00	0	0	0.00	
People	27,000	0	0	27,000	4.44	9,900	2.70	0	0	0.00	0	0	0.00	
Misc	27,646	0	0	27,646	4.55	27,646	7.53	0	0	0.00	0	0	0.00	
Sub Total==>	243,733	0	0	243,733	40.10	226,633	61.75	0	0	0.00	0	0	0.00	
Ceiling Load	0	0	0	0	0.00	0	0.00	0	0	0.00	0	0	0.00	
Outside Air	0	0	0	154,330	25.39	0	0.00	0	0	0.00	0	0	0.00	
Sup. Fan Heat				26,279	4.32		0.00		25,577	-9.16				
Ret. Fan Heat		0	0	0	0.00		0.00		0	0.00				
Duct Heat PkUp		0	0	0	0.00		0.00		0	0.00				
OV/UNDR Sizing	0	0	0	0	0.00	0	0.00	0	0	0.00	0	0	0.00	
Exhaust Heat		0	0	0	0.00		0.00		0	0.00				
Terminal Bypass		0	0	0	-0.00		0.00		0	0.00				
Grand Total==>	427,178	0	0	607,786	100.00	366,989	100.00	-304,694	-279,118	100.00				

-----COOLING COIL SELECTION-----										-----AREAS-----		
	Total Capacity (Tons)	Sens Cap. (Mbh)	Coil Airfl (Mbh)	Entering DB/WB/HR (Deg F)	Leaving DB/WB/HR (Deg F)	Grains	Entering DB/WB/HR (Deg F)	Leaving DB/WB/HR (Deg F)	Grains	Gross Total	Glass (sf)	(%)
Main Clg	50.7	607.9	448.7	19,450	74.7	62.4	69.1	53.0	51.4	57.0	Floor	26,557
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	Part	10,800
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	ExFlr	415
Totals	50.7	607.9									Roof	24,109
											Wall	7,380
												568
												8

-----HEATING COIL SELECTION-----					-----AIRFLOWS (cfm)-----					--ENGINEERING CHECKS--		--TEMPERATURES (F)---	
Capacity (Mbh)	Coil Airfl (cfm)	Ent Deg F	Lvg Deg F	Type	Cooling	Heating	Clg % OA	12.2	Type	Clg	Htg		
Main Htg	-363.3	18,930	69.1	87.2	Infil	1,032	1,032	Clg Cfm/Sqft	0.73	SADB	54.2	87.2	
Aux Htg	0.0	0	0.0	0.0	Supply	19,450	18,930	Clg Cfm/Ton	383.94	Plenum	72.0	72.0	
Preheat	-0.0	2,370	3.0	53.0	Mincfm	0	0	Clg Sqft/Ton	524.24	Return	72.0	72.0	
Reheat	-0.0	0	0.0	0.0	Return	19,450	0	Clg Btuh/Sqft	22.89	Ret/OA	74.7	3.0	
Humidif	0.0	0	0.0	0.0	Exhaust	2,370	0	No. People	36	Runarnd	72.0	72.0	
Opt Vent	0.0	0	0.0	0.0	Rm Exh	0	0	Htg % OA	0.0	Fn MtrTD	0.3	0.1	
Total	-363.3				Auxil	0	0	Htg Cfm/SqFt	0.71	Fn BldTD	0.2	0.1	
								Htg Btuh/SqFt	-13.68	Fn Frict	0.7	0.3	

MAIN SYSTEM COOLING - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- P E A K C O O L I N G L O A D S -----  
(Main System)

		----- Space -----							----- Coil -----						
Room Number	Description	Peak	OA	Rm	Supp.	Space	Space	Space	Peak	OA	Rm	Supp.	Coil	Coil	Coil
		Time	Cond.	Dry	Dry	Air	Sens.	Lat.	Time	Cond.	Dry	Dry	Air	Sens.	Lat.
		Mo/Hr	DB/WE	Blb	Bulb	Flow	Load	Load	Mo/Hr	DB/WE	Blb	Bulb	Flow	Load	Load
			(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)		(F)	(F)	(F)	(Cfm)	(Btuh)	(Btuh)
3	GEN MAINT ADMIN	7/15	94	78	72	65.8	8,080	53,206	9,541	7/15	94	78	72	65.8	8,080
Zone	3 Total/Ave.		94	78	72	65.8	8,080	53,206	9,541		94	78	72	65.8	8,080
Zone	3 Block	7/15	94	78	72	65.8	8,080	53,206	9,541	7/15	94	78	72	65.8	8,080
System	3 Total/Ave.		94	78	72	65.8	8,080	53,206	9,541		94	78	72	65.8	8,080
System	3 Block	7/15	94	78	72	65.8	8,080	53,206	9,541	7/15	94	78	72	65.8	8,080
6	GEN MAINT ADMIN	7/15	94	78	72	54.2	23,700	447,186	60,189	7/15	94	78	72	54.2	19,450
Zone	6 Total/Ave.		94	78	72	54.2	23,700	447,186	60,189		94	78	72	54.2	19,450
Zone	6 Block	7/15	94	78	72	54.2	23,700	447,186	60,189	7/15	94	78	72	54.2	19,450
System	4 Total/Ave.		94	78	72	54.2	23,700	447,186	60,189		94	78	72	54.2	19,450
System	4 Block	7/15	94	78	72	54.2	19,450	366,989	60,189	7/15	94	78	72	54.2	19,450

MAIN SYSTEM HEATING - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- P E A K H E A T I N G L O A D S -----  
(Main System)

		Space							Coil					
Room Number	Description	Floor Area (Sq Ft)	Peak	OA	Rm	Supp.	Space	Space	Peak	OA	Rm	Supp.	Coil	Coil
			Time	Cond.	Dry	Dry	Air	Sens.	Time	Cond.	Dry	Dry	Air	Sens.
			Mo/Hr	DB/WB	Blb	Bulb	Flow	Load	Mo/Hr	DB/WB	Blb	Bulb	Flow	Load
				(F)	(F)	(F)	(Cfm)	(Btuh)		(F)	(F)	(F)	(Cfm)	(Btuh)
1	GEN MAINT BAYS	19,255	13/ 1	3	1	70	93.4	79,100 -1,966,566	13/ 1	3	1	70	93.4	79,100 -1,966,566
Zone	1 Total/Ave.	19,255		3	1	70	93.4	79,100 -1,966,566		3	1	70	93.4	79,100 -1,966,566
Zone	1 Block	19,255	13/ 1	3	1	70	93.4	79,100 -1,966,566	13/ 1	3	1	70	93.4	79,100 -1,966,566
4	GEN MAINT BAYS	8,520	13/ 1	3	1	70	84.5	59,261 -912,397	13/ 1	3	1	70	84.5	59,261 -912,397
Zone	4 Total/Ave.	8,520		3	1	70	84.5	59,261 -912,397		3	1	70	84.5	59,261 -912,397
Zone	4 Block	8,520	13/ 1	3	1	70	84.5	59,261 -912,397	13/ 1	3	1	70	84.5	59,261 -912,397
System	1 Total/Ave.	27,775		3	1	70	89.6	138,361 -2,878,963		3	1	70	89.6	138,361 -2,878,963
System	1 Block	27,775	13/ 1	3	1	70	89.6	138,361 -2,878,963	13/ 1	3	1	70	89.6	138,361 -2,878,963
2	GEN MAINT SHOP	65,268	13/ 1	3	1	70	73.8	83,900 -341,970	13/ 1	3	1	70	73.8	83,900 -2,792,256
Zone	2 Total/Ave.	65,268		3	1	70	73.8	83,900 -341,970		3	1	70	73.8	83,900 -2,792,256
Zone	2 Block	65,268	13/ 1	3	1	70	73.8	83,900 -341,970	13/ 1	3	1	70	73.8	83,900 -2,792,256
5	GEN MAINT SHOP	75,060	13/ 1	3	1	70	80.4	83,550 -922,560	13/ 1	3	1	70	80.4	83,550 -5,797,537
Zone	5 Total/Ave.	75,060		3	1	70	80.4	83,550 -922,560		3	1	70	80.4	83,550 -5,797,537
Zone	5 Block	75,060	13/ 1	3	1	70	80.4	83,550 -922,560	13/ 1	3	1	70	80.4	83,550 -5,797,537
System	2 Total/Ave.	140,328		3	1	70	77.1	167,450 -1,264,531		3	1	70	77.1	167,450 -8,589,792
System	2 Block	140,328	13/ 1	3	1	70	77.1	167,450 -1,264,531	13/ 1	3	1	70	77.1	167,450 -8,589,792
3	GEN MAINT ADMIN	4,216	13/ 1	3	1	72	74.4	8,080 -20,943	13/ 1	3	1	72	74.4	8,080 -76,134
Zone	3 Total/Ave.	4,216		3	1	72	74.4	8,080 -20,943		3	1	72	74.4	8,080 -76,134
Zone	3 Block	4,216	13/ 1	3	1	72	74.4	8,080 -20,943	13/ 1	3	1	72	74.4	8,080 -76,134
System	3 Total/Ave.	4,216		3	1	72	74.4	8,080 -20,943		3	1	72	74.4	8,080 -76,134
System	3 Block	4,216	13/ 1	3	1	72	74.4	8,080 -20,943	13/ 1	3	1	72	74.4	8,080 -76,134
6	GEN MAINT ADMIN	26,557	13/ 1	3	1	72	87.2	18,930 -304,694	13/ 1	3	1	72	87.2	18,930 -293,925
Zone	6 Total/Ave.	26,557		3	1	72	87.2	18,930 -304,694		3	1	72	87.2	18,930 -293,925
Zone	6 Block	26,557	13/ 1	3	1	72	87.2	18,930 -304,694	13/ 1	3	1	72	87.2	18,930 -293,925
System	4 Total/Ave.	26,557		3	1	72	87.2	18,930 -304,694		3	1	72	87.2	18,930 -293,925
System	4 Block	26,557	13/ 1	3	1	72	87.2	18,930 -304,694	13/ 1	3	1	72	87.2	18,930 -293,925

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- I N T E R N A L C O O L I N G L O A D S -----  
(At time of Coil Peak)

Room Number	Description	Lights Room Sensible	Lights Ret. Air Sensible	Lites CLF	People Sensible	People Latent	Peopl CLF	Misc. Space Sensible	Misc. Space Latent	Misc. Ret. Air Sensible	Misc. Air CLF	Total (Btuh)
		(Btuh)	(Btuh)		(Btuh)	(Btuh)		(Btuh)	(Btuh)	(Btuh)		
3	GEN MAINT ADMIN	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
Zone	3 Total/Ave.	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
Zone	3 Block	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
System	3 Total/Ave.	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
System	3 Block	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
6	GEN MAINT ADMIN	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
Zone	6 Total/Ave.	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
Zone	6 Block	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
System	4 Total/Ave.	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
System	4 Block	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- I N T E R N A L C O O L I N G L O A D S -----  
(At time of Space Peak)

Room Number	Description	Lights Room Sensible	Lights Ret. Air Sensible	Lites CLF	People Sensible	People Latent	Peopl CLF	Misc. Space Sensible	Misc. Space Latent	Misc. Ret. Air Sensible	Misc. Air CLF	Total (Btuh)
		(Btuh)	(Btuh)		(Btuh)	(Btuh)		(Btuh)	(Btuh)	(Btuh)		
3	GEN MAINT ADMIN	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
Zone	3 Total/Ave.	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
Zone	3 Block	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
System	3 Total/Ave.	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
System	3 Block	21,215	0	1.000	4,125	7,125	1.000	11,725	0	0	0.560	44,190
6	GEN MAINT ADMIN	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
Zone	6 Total/Ave.	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
Zone	6 Block	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
System	4 Total/Ave.	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733
System	4 Block	189,087	0	1.000	9,900	17,100	1.000	27,646	0	0	0.570	243,733



COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE COOLING LOADS -----													
(Roof - Skylight)													
(At time of Coil Peak)													
Room Number	Description	Roof		Roof		Skylight		Skylight		Skylight		Skylight	
		Return Air Sensible Load	Roof R.A. CLTD	Space Sensible Load	Roof Space CLTD	Return Air Solar	Skylight Space Solar	Skylt Solar CLF	Return Air Conduction Load	Skylt R.A. CLTD	Space Conduction Load	Skylt Space CLTD	Skylt Space CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	(F)
3	GEN MAINT ADMIN	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	0.0
Zone	3 Total/Ave.	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	0.0
Zone	3 Block	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	0.0
System	3 Total/Ave.	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	0.0
System	3 Block	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	0.0
6	GEN MAINT ADMIN	0	0.0	64,378	38.7	0	0	0.000	0	0.0	0	0.0	0.0
Zone	6 Total/Ave.	0	0.0	64,378	38.7	0	0	0.000	0	0.0	0	0.0	0.0
Zone	6 Block	0	0.0	64,378	38.7	0	0	0.000	0	0.0	0	0.0	0.0
System	4 Total/Ave.	0	0.0	64,378	38.7	0	0	0.000	0	0.0	0	0.0	0.0
System	4 Block	0	0.0	64,378	38.7	0	0	0.000	0	0.0	0	0.0	0.0

----- BUILDING ENVELOPE COOLING LOADS -----													
(Wall - Window)													
(At time of Coil Peak)													
Room Number	Description	Wall		Wall		Glass		Glass		Glass		Glass	
		Plenum Load	Wall CLTD	Space Load	Wall CLTD	Space Solar	Return Air Solar	Glass Solar CLF	Glass Conduction Load	Glass Space CLTD	Return Air Conduction Load	Glass Return Air CLTD	Glass R.A. CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	(F)
3	GEN MAINT ADMIN	0	0.0	3,265	44.4	8,520	0	0.580	1,486	21.8	0	0.0	0.0
Zone	3 Total/Ave.	0	0.0	3,265	44.4	8,520	0	0.580	1,486	21.8	0	0.0	0.0
Zone	3 Block	0	0.0	3,265	44.4	8,520	0	0.580	1,486	21.8	0	0.0	0.0
System	3 Total/Ave.	0	0.0	3,265	44.4	8,520	0	0.580	1,486	21.8	0	0.0	0.0
System	3 Block	0	0.0	3,265	44.4	8,520	0	0.580	1,486	21.8	0	0.0	0.0
6	GEN MAINT ADMIN	0	0.0	30,063	28.8	14,768	0	0.530	7,033	21.8	0	0.0	0.0
Zone	6 Total/Ave.	0	0.0	30,063	28.8	14,768	0	0.530	7,033	21.8	0	0.0	0.0
Zone	6 Block	0	0.0	30,063	28.8	14,768	0	0.530	7,033	21.8	0	0.0	0.0
System	4 Total/Ave.	0	0.0	30,063	28.8	14,768	0	0.530	7,033	21.8	0	0.0	0.0
System	4 Block	0	0.0	30,063	28.8	14,768	0	0.530	7,033	21.8	0	0.0	0.0

----- BUILDING ENVELOPE COOLING LOADS -----											
(Exposed Floor - Partitions - Infiltration)											
(At time of Coil Peak)											
Room Number	Description	Exposed		Partition		Infiltr.		Infiltr.		Plenum	
		Floor Sensible Load	Expsd Floor CLTD	Sensible Load	Part. CLTD	Airflow Airflow	Infiltr. Sensible	Infiltr. Sensible	Latent	Dry B Temp.	Envelope Sensible Load
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(Btuh)	(F)	(Btuh)
3	GEN MAINT ADMIN	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
Zone	3 Total/Ave.	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
Zone	3 Block	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
System	3 Total/Ave.	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
System	3 Block	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G E N V E L O P E C O O L I N G L O A D S -----

(Exposed Floor - Partitions - Infiltration)

(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
6	GEN MAINT ADMIN	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
Zone	6 Total/Ave.	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
Zone	6 Block	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
System	4 Total/Ave.	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
System	4 Block	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444

----- BUILDING ENVELOPE COOLING LOADS -----

----- BUILDING ENVELOPE COOLING LOADS -----

----- BUILDING ENVELOPE COOLING LOADS -----

Room Number	Description	Exposed	Expsd	Partition		Infilt.	Infilt.	Plenm	Ceiling	Envelope Total	
		Floor Sensible (Btuh)	Floor CLTD (F)	Sensible (Btuh)	CLTD (F)	Airflow (Cfm)	Sensible (Btuh)	Infilt. Latent (Btuh)	Dry B Temp. (F)		Sensible Load (Btuh)
3	GEN MAINT ADMIN	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
Zone	3 Total/Ave.	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
Zone	3 Block	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
System	3 Total/Ave.	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954
System	3 Block	0	0.0	0	0.0	97	2,266	2,416	72.0	0	17,954

COOLING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G E N V E L O P E C O O L I N G L O A D S -----

(Exposed Floor - Partitions - Infiltration)

(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
6	GEN MAINT ADMIN	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
Zone	6 Total/Ave.	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
Zone	6 Block	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
System	4 Total/Ave.	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444
System	4 Block	0	0.0	0	0.0	1,032	24,113	43,089	72.0	0	183,444

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- BUILDING ENVELOPE HEATING LOADS -----												
(Roof - Skylight)												
(At time of Coil Peak)												
Room Number	Description	Roof		Roof		Skylight Return Air Solar	Skylight Space Solar	Skylt CLF	Skylight		Skylight	
		Return Air Load (Btuh)	R.A. CLTD (F)	Space Load (Btuh)	Space CLTD (F)				Return Air Conduction Load (Btuh)	Skylt R.A. CLTD (F)	Space Conduction Load (Btuh)	Skylt Space CLTD (F)
1	GEN MAINT BAYS	0	0.0	-92,104	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-92,104	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	1 Block	0	0.0	-92,104	-67.0	0	0	0.000	0	0.0	0	0.0
4	GEN MAINT BAYS	0	0.0	-39,388	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-39,388	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	4 Block	0	0.0	-39,388	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Total/Ave.	0	0.0	-131,492	-67.0	0	0	0.000	0	0.0	0	0.0
System	1 Block	0	0.0	-131,492	-67.0	0	0	0.000	0	0.0	0	0.0
2	GEN MAINT SHOP	0	0.0	-299,570	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	2 Total/Ave.	0	0.0	-299,570	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	2 Block	0	0.0	-299,570	-67.0	0	0	0.000	0	0.0	0	0.0
5	GEN MAINT SHOP	0	0.0	-337,558	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	5 Total/Ave.	0	0.0	-337,558	-67.0	0	0	0.000	0	0.0	0	0.0
Zone	5 Block	0	0.0	-337,558	-67.0	0	0	0.000	0	0.0	0	0.0
System	2 Total/Ave.	0	0.0	-637,128	-67.0	0	0	0.000	0	0.0	0	0.0
System	2 Block	0	0.0	-637,128	-67.0	0	0	0.000	0	0.0	0	0.0
3	GEN MAINT ADMIN	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
Zone	3 Total/Ave.	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
Zone	3 Block	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
System	3 Total/Ave.	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
System	3 Block	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0
6	GEN MAINT ADMIN	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0
Zone	6 Total/Ave.	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0
Zone	6 Block	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0
System	4 Total/Ave.	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0
System	4 Block	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0

----- BUILDING ENVELOPE HEATING LOADS -----												
(Wall - Window)												
(At time of Coil Peak)												
Room Number	Description	Wall		Wall		Glass Space Solar	Glass Return Air Solar	Glass CLF	Glass		Glass	
		Plenum Load (Btuh)	Plenum CLTD (F)	Space Load (Btuh)	Space CLTD (F)				Space Conduction Load (Btuh)	Space CLTD (F)	Return Air Conduction Load (Btuh)	R.A. CLTD (F)
1	GEN MAINT BAYS	0	0.0	-455,638	-67.0	0	0	0.000	-137,920	-67.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-455,638	-67.0	0	0	0.000	-137,920	-67.0	0	0.0
Zone	1 Block	0	0.0	-455,638	-67.0	0	0	0.000	-137,920	-67.0	0	0.0
4	GEN MAINT BAYS	0	0.0	-238,223	-67.0	0	0	0.000	-51,111	-67.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-238,223	-67.0	0	0	0.000	-51,111	-67.0	0	0.0
Zone	4 Block	0	0.0	-238,223	-67.0	0	0	0.000	-51,111	-67.0	0	0.0
System	1 Total/Ave.	0	0.0	-693,860	-67.0	0	0	0.000	-189,031	-67.0	0	0.0
System	1 Block	0	0.0	-693,860	-67.0	0	0	0.000	-189,031	-67.0	0	0.0
2	GEN MAINT SHOP	0	0.0	-12,486	-67.0	0	0	0.000	-11,855	-67.0	0	0.0

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Wall - Window)  
(At time of Coil Peak)

Room Number	Description	Wall Plenum Load	Wall Plenum CLTD	Wall Space Load	Wall Space CLTD	Glass Space Solar	Glass Return Air Solar	Glass Solar CLF	Glass Conduction	Glass Space CLTD	Glass Return Air Conduction	Glass R.A. CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)
Zone	2 Total/Ave.	0	0.0	-12,486	-67.0	0	0	0.000	-11,855	-67.0	0	0.0
Zone	2 Block	0	0.0	-12,486	-67.0	0	0	0.000	-11,855	-67.0	0	0.0
	5 GEN MAINT SHOP	0	0.0	-199,530	-67.0	0	0	0.000	-180,166	-67.0	0	0.0
Zone	5 Total/Ave.	0	0.0	-199,530	-67.0	0	0	0.000	-180,166	-67.0	0	0.0
Zone	5 Block	0	0.0	-199,530	-67.0	0	0	0.000	-180,166	-67.0	0	0.0
System	2 Total/Ave.	0	0.0	-212,016	-67.0	0	0	0.000	-192,021	-67.0	0	0.0
System	2 Block	0	0.0	-212,016	-67.0	0	0	0.000	-192,021	-67.0	0	0.0
	3 GEN MAINT ADMIN	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
Zone	3 Total/Ave.	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
Zone	3 Block	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
System	3 Total/Ave.	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
System	3 Block	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
	6 GEN MAINT ADMIN	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
Zone	6 Total/Ave.	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
Zone	6 Block	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
System	4 Total/Ave.	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
System	4 Block	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible	Exposed Floor CLTD	Partition Sensible	Partition CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
	1 GEN MAINT BAYS	-41,390	-67.0	0	0.0	17,419	-1,239,515	0	70.0	0	-1,966,566
Zone	1 Total/Ave.	-41,390	-67.0	0	0.0	17,419	-1,239,515	0	70.0	0	-1,966,566
Zone	1 Block	-41,390	-67.0	0	0.0	17,419	-1,239,515	0	70.0	0	-1,966,566
	4 GEN MAINT BAYS	-17,821	-67.0	0	0.0	7,952	-565,855	0	70.0	0	-912,397
Zone	4 Total/Ave.	-17,821	-67.0	0	0.0	7,952	-565,855	0	70.0	0	-912,397
Zone	4 Block	-17,821	-67.0	0	0.0	7,952	-565,855	0	70.0	0	-912,397
System	1 Total/Ave.	-59,211	-67.0	0	0.0	25,371	-1,805,369	0	70.0	0	-2,878,963
System	1 Block	-59,211	-67.0	0	0.0	25,371	-1,805,370	0	70.0	0	-2,878,963
	2 GEN MAINT SHOP	-2,830	-67.0	0	0.0	214	-15,228	0	70.0	0	-341,970
Zone	2 Total/Ave.	-2,830	-67.0	0	0.0	214	-15,228	0	70.0	0	-341,970
Zone	2 Block	-2,830	-67.0	0	0.0	214	-15,228	0	70.0	0	-341,970
	5 GEN MAINT SHOP	-34,668	-67.0	0	0.0	2,398	-170,639	0	70.0	0	-922,560
Zone	5 Total/Ave.	-34,668	-67.0	0	0.0	2,398	-170,639	0	70.0	0	-922,560
Zone	5 Block	-34,668	-67.0	0	0.0	2,398	-170,639	0	70.0	0	-922,560
System	2 Total/Ave.	-37,499	-67.0	0	0.0	2,612	-185,867	0	70.0	0	-1,264,531
System	2 Block	-37,499	-67.0	0	0.0	2,612	-185,867	0	70.0	0	-1,264,531
	3 GEN MAINT ADMIN	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
Zone	3 Total/Ave.	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943

HEATING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)  
(At time of Coil Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
Zone	3 Block	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
System	3 Total/Ave.	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
System	3 Block	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
6	GEN MAINT ADMIN	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
Zone	6 Total/Ave.	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
Zone	6 Block	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
System	4 Total/Ave.	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
System	4 Block	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S													
(Roof - Skylight)													
(At time of Space Peak)													
		Roof		Roof		Skylight		Skylight		Skylight		Skylight	
		Return Air	Roof	Space	Roof	Skylight	Skylight	Skylt	Return Air	Skylt	Space	Skylt	
		Sensible	R.A.	Sensible	Space	Return Air	Space	Solar	Conduction	R.A.	Conduction	Space	
Room		Load	CLTD	Load	CLTD	Solar	Solar	CLF	Load	CLTD	Load	CLTD	
Number	Description	(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)	
1	GEN MAINT BAYS	0	0.0	-92,104	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	1 Total/Ave.	0	0.0	-92,104	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	1 Block	0	0.0	-92,104	-67.0	0	0	0.000	0	0.0	0	0.0	
4	GEN MAINT BAYS	0	0.0	-39,388	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	4 Total/Ave.	0	0.0	-39,388	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	4 Block	0	0.0	-39,388	-67.0	0	0	0.000	0	0.0	0	0.0	
System	1 Total/Ave.	0	0.0	-131,492	-67.0	0	0	0.000	0	0.0	0	0.0	
System	1 Block	0	0.0	-131,492	-67.0	0	0	0.000	0	0.0	0	0.0	
2	GEN MAINT SHOP	0	0.0	-299,570	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	2 Total/Ave.	0	0.0	-299,570	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	2 Block	0	0.0	-299,570	-67.0	0	0	0.000	0	0.0	0	0.0	
5	GEN MAINT SHOP	0	0.0	-337,558	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	5 Total/Ave.	0	0.0	-337,558	-67.0	0	0	0.000	0	0.0	0	0.0	
Zone	5 Block	0	0.0	-337,558	-67.0	0	0	0.000	0	0.0	0	0.0	
System	2 Total/Ave.	0	0.0	-637,128	-67.0	0	0	0.000	0	0.0	0	0.0	
System	2 Block	0	0.0	-637,128	-67.0	0	0	0.000	0	0.0	0	0.0	
3	GEN MAINT ADMIN	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	
Zone	3 Total/Ave.	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	
Zone	3 Block	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	
System	3 Total/Ave.	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	
System	3 Block	0	0.0	0	0.0	0	0	0.000	0	0.0	0	0.0	
6	GEN MAINT ADMIN	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0	
Zone	6 Total/Ave.	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0	
Zone	6 Block	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0	
System	4 Total/Ave.	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0	
System	4 Block	0	0.0	-114,783	-69.0	0	0	0.000	0	0.0	0	0.0	

B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S												
(Wall - Window)												
(At time of Space Peak)												
Room		Wall	Wall	Wall	Wall	Glass	Glass	Glass	Glass	Glass	Glass	Glass
		Plenum	Plenn	Space	Space	Space	Return Air	Solar	Space	Space	Return Air	R.A.
Number	Description	Load	CLTD	Load	CLTD	Solar	Solar	CLF	Conduction	CLTD	Conduction	CLTD
		(Btuh)	(F)	(Btuh)	(F)	(Btuh)	(Btuh)		(Btuh)	(F)	(Btuh)	(F)
1	GEN MAINT BAYS	0	0.0	-455,638	-67.0	0	0	0.000	-137,920	-67.0	0	0.0
Zone	1 Total/Ave.	0	0.0	-455,638	-67.0	0	0	0.000	-137,920	-67.0	0	0.0
Zone	1 Block	0	0.0	-455,638	-67.0	0	0	0.000	-137,920	-67.0	0	0.0
4	GEN MAINT BAYS	0	0.0	-238,223	-67.0	0	0	0.000	-51,111	-67.0	0	0.0
Zone	4 Total/Ave.	0	0.0	-238,223	-67.0	0	0	0.000	-51,111	-67.0	0	0.0
Zone	4 Block	0	0.0	-238,223	-67.0	0	0	0.000	-51,111	-67.0	0	0.0
System	1 Total/Ave.	0	0.0	-693,860	-67.0	0	0	0.000	-189,031	-67.0	0	0.0
System	1 Block	0	0.0	-693,860	-67.0	0	0	0.000	-189,031	-67.0	0	0.0
2	GEN MAINT SHOP	0	0.0	-12,486	-67.0	0	0	0.000	-11,855	-67.0	0	0.0



HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----

(Wall - Window)  
(At time of Space Peak)

Room Number	Description	Wall Plenum Load (Btuh)	Wall Plenum CLTD (F)	Wall Space Load (Btuh)	Wall Space CLTD (F)	Glass Space Solar (Btuh)	Glass Return Air Solar (Btuh)	Glass Solar CLF	Glass Space Conduction (Btuh)	Glass Space CLTD (F)	Glass Return Air Conduction (Btuh)	Glass R.A. CLTD (F)
Zone	2 Total/Ave.	0	0.0	-12,486	-67.0	0	0	0.000	-11,855	-67.0	0	0.0
Zone	2 Block	0	0.0	-12,486	-67.0	0	0	0.000	-11,855	-67.0	0	0.0
5	GEN MAINT SHOP	0	0.0	-199,530	-67.0	0	0	0.000	-180,166	-67.0	0	0.0
Zone	5 Total/Ave.	0	0.0	-199,530	-67.0	0	0	0.000	-180,166	-67.0	0	0.0
Zone	5 Block	0	0.0	-199,530	-67.0	0	0	0.000	-180,166	-67.0	0	0.0
System	2 Total/Ave.	0	0.0	-212,016	-67.0	0	0	0.000	-192,021	-67.0	0	0.0
System	2 Block	0	0.0	-212,016	-67.0	0	0	0.000	-192,021	-67.0	0	0.0
3	GEN MAINT ADMIN	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
Zone	3 Total/Ave.	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
Zone	3 Block	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
System	3 Total/Ave.	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
System	3 Block	0	0.0	-5,074	-69.0	0	0	0.000	-4,935	-69.0	0	0.0
6	GEN MAINT ADMIN	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
Zone	6 Total/Ave.	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
Zone	6 Block	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
System	4 Total/Ave.	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0
System	4 Block	0	0.0	-72,026	-69.0	0	0	0.000	-23,358	-69.0	0	0.0

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----

(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible (Btuh)	Expsd Floor CLTD (F)	Partition Sensible (Btuh)	Part. CLTD (F)	Infiltr. Airflow (Cfm)	Infiltr. Sensible (Btuh)	Infiltr. Latent (Btuh)	Plenum Dry B Temp. (F)	Ceiling Sensible Load (Btuh)	Envelope Total (Btuh)
1	GEN MAINT BAYS	-41,390	-67.0	0	0.0	17,419	-1,239,515	0	70.0	0	-1,966,566
Zone	1 Total/Ave.	-41,390	-67.0	0	0.0	17,419	-1,239,515	0	70.0	0	-1,966,566
Zone	1 Block	-41,390	-67.0	0	0.0	17,419	-1,239,515	0	70.0	0	-1,966,566
4	GEN MAINT BAYS	-17,821	-67.0	0	0.0	7,952	-565,855	0	70.0	0	-912,397
Zone	4 Total/Ave.	-17,821	-67.0	0	0.0	7,952	-565,855	0	70.0	0	-912,397
Zone	4 Block	-17,821	-67.0	0	0.0	7,952	-565,855	0	70.0	0	-912,397
System	1 Total/Ave.	-59,211	-67.0	0	0.0	25,371	-1,805,369	0	70.0	0	-2,878,963
System	1 Block	-59,211	-67.0	0	0.0	25,371	-1,805,370	0	70.0	0	-2,878,963
2	GEN MAINT SHOP	-2,830	-67.0	0	0.0	214	-15,228	0	70.0	0	-341,970
Zone	2 Total/Ave.	-2,830	-67.0	0	0.0	214	-15,228	0	70.0	0	-341,970
Zone	2 Block	-2,830	-67.0	0	0.0	214	-15,228	0	70.0	0	-341,970
5	GEN MAINT SHOP	-34,668	-67.0	0	0.0	2,398	-170,639	0	70.0	0	-922,560
Zone	5 Total/Ave.	-34,668	-67.0	0	0.0	2,398	-170,639	0	70.0	0	-922,560
Zone	5 Block	-34,668	-67.0	0	0.0	2,398	-170,639	0	70.0	0	-922,560
System	2 Total/Ave.	-37,499	-67.0	0	0.0	2,612	-185,867	0	70.0	0	-1,264,531
System	2 Block	-37,499	-67.0	0	0.0	2,612	-185,867	0	70.0	0	-1,264,531
3	GEN MAINT ADMIN	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
Zone	3 Total/Ave.	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943

HEATING LOADS AT SPACE PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G   E N V E L O P E   H E A T I N G   L O A D S -----  
(Exposed Floor - Partitions - Infiltration)  
(At time of Space Peak)

Room Number	Description	Exposed Floor Sensible	Expsd Floor CLTD	Partition Sensible	Part. CLTD	Infilt. Airflow	Infilt. Sensible	Infilt. Latent	Plenum Dry B Temp.	Ceiling Sensible Load	Envelope Total
		(Btuh)	(F)	(Btuh)	(F)	(Cfm)	(Btuh)	(Btuh)	(F)	(Btuh)	(Btuh)
Zone	3 Block	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
System	3 Total/Ave.	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
System	3 Block	-3,825	-69.0	0	0.0	97	-7,108	0	72.0	0	-20,943
6	GEN MAINT ADMIN	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
Zone	6 Total/Ave.	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
Zone	6 Block	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
System	4 Total/Ave.	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694
System	4 Block	-18,899	-69.0	0	0.0	1,032	-75,628	0	72.0	0	-304,694

COOLING LOADS AT COIL PEAK - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- A I R F L O W C O O L I N G L O A D S -----  
(At time of Coil Peak)

		----- Ventilation -----			----- Optional Ventilation -----			----- Bypass -----			Ov/Undr
Room	Description	Airflow	Sensible	Latent	Airflow	Sensible	Latent	Airflow	Sensible	Latent	Sizing
Number		(Cfm)	(Btuh)	(Btuh)	(Cfm)	(Btuh)	(Btuh)	(Cfm)	(Btuh)	(Btuh)	(Btuh)
3	GEN MAINT ADMIN	808	18,879	20,126	0	0	0	0	0	0	603
Zone	3 Total/Ave.	808	18,879	20,126	0	0	0	0	0	0	603
Zone	3 Block	808	18,879	20,126	0	0	0	0	0	0	603
System	3 Total/Ave.	808	18,879	20,126	0	0	0	0	0	0	603
System	3 Block	808	18,879	20,126	0	0	0	0	0	0	0
6	GEN MAINT ADMIN	2,370	55,376	98,953	0	0	0	0	0	0	80,197
Zone	6 Total/Ave.	2,370	55,376	98,953	0	0	0	0	0	0	0
Zone	6 Block	2,370	55,376	98,953	0	0	0	0	0	0	80,197
System	4 Total/Ave.	2,370	55,376	98,953	0	0	0	0	0	0	0
System	4 Block	2,370	55,376	98,953	0	0	0	0	0	0	0

----- AIRFLOW HEATING LOADS -----  
(At time of Coil Peak)

[illegible]

COOLING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- AIRFLOW HEAT GAIN AND LOSS -----  
(At time of Coil Peak)

Room Number	Description	Duct Heat Pickup (Btuh)	Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	Cooling							System Return Airflow (Cfm)
						System Exhaust Total (Btuh)	Room Exhaust Airflow (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around Airflow (Cfm)	Corridor Airflow (Cfm)	System Return Airflow (Cfm)	
3	GEN MAINT ADMIN	0	4,022	0	0	4,022	808	0	8,080	0	0	0	8,080
Zone	3 Total/Ave.	0	4,022	0	0	4,022	808	0	8,080	0	0	0	8,080
Zone	3 Block	0	4,022	0	0	4,022	808	0	8,080	0	0	0	8,080
System	3 Total/Ave.	0	4,022	0	0	4,022	808	0	8,080	0	0	0	8,080
System	3 Block	0	4,022	0	0	4,022	808	0	8,080	0	0	0	19,450
6	GEN MAINT ADMIN	0	26,279	0	0	26,279	2,370	0	19,450	0	0	0	19,450
Zone	6 Total/Ave.	0	26,279	0	0	26,279	2,370	0	19,450	0	0	0	19,450
Zone	6 Block	0	26,279	0	0	26,279	2,370	0	19,450	0	0	0	19,450
System	4 Total/Ave.	0	26,279	0	0	26,279	2,370	0	19,450	0	0	0	19,450
System	4 Block	0	26,279	0	0	26,279	2,370	0	19,450	0	0	0	19,450

HEATING AIRFLOW HEAT GAIN/LOSS - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- A I R F L O W H E A T G A I N A N D L O S S -----  
(At time of Coil Peak)

Room Number	Description	Supply Fan Heat (Btuh)	Return Fan Heat (Btuh)	System Exhaust Heat Loss (Btuh)	Heating							System Return Airflow (Cfm)
					Total (Btuh)	System Exhaust Airflow (Cfm)	Room Exhaust Airflow (Cfm)	Ducted Airflow (Cfm)	Plenum Airflow (Cfm)	Run Around Airflow (Cfm)	Corridor Airflow (Cfm)	
1	GEN MAINT BAYS	0	0	0	0	0	0	0	0	0	0	0 79,100
Zone	1 Total/Ave.	0	0	0	0	0	0	0	0	0	0	0 79,100
Zone	1 Block	0	0	0	0	0	0	0	0	0	0	0 59,261
4	GEN MAINT BAYS	0	0	0	0	0	0	0	0	0	0	0 59,261
Zone	4 Total/Ave.	0	0	0	0	0	0	0	0	0	0	0 59,261
Zone	4 Block	0	0	0	0	0	0	0	0	0	0	0 138,361
System	1 Total/Ave.	0	0	0	0	0	0	0	0	0	0	0 138,361
System	1 Block	0	0	0	0	0	0	0	0	0	0	0 83,900
2	GEN MAINT SHOP	40,272	0	0	40,272	35,000	0	0	0	0	0	0 83,900
Zone	2 Total/Ave.	40,272	0	0	40,272	35,000	0	0	0	0	0	0 83,900
Zone	2 Block	40,272	0	0	40,272	35,000	0	0	0	0	0	0 83,550
5	GEN MAINT SHOP	40,104	0	0	40,104	69,072	0	0	0	0	0	0 83,550
Zone	5 Total/Ave.	40,104	0	0	40,104	69,072	0	0	0	0	0	0 83,550
Zone	5 Block	40,104	0	0	40,104	69,072	0	0	0	0	0	0 167,450
System	2 Total/Ave.	80,376	0	0	80,376	104,072	0	0	0	0	0	0 167,450
System	2 Block	80,376	0	0	80,376	104,072	0	0	0	0	0	0 8,080
3	GEN MAINT ADMIN	4,022	0	0	4,022	808	0	8,080	0	0	0	0 8,080
Zone	3 Total/Ave.	4,022	0	0	4,022	808	0	8,080	0	0	0	0 8,080
Zone	3 Block	4,022	0	0	4,022	808	0	8,080	0	0	0	0 8,080
System	3 Total/Ave.	4,022	0	0	4,022	808	0	8,080	0	0	0	0 8,080
System	3 Block	4,022	0	0	4,022	808	0	8,080	0	0	0	0 0
6	GEN MAINT ADMIN	25,577	0	0	25,577	0	0	18,930	0	18,930	0	0 0
Zone	6 Total/Ave.	25,577	0	0	25,577	0	0	18,930	0	18,930	0	0 0
Zone	6 Block	25,577	0	0	25,577	0	0	18,930	0	18,930	0	0 0
System	4 Total/Ave.	25,577	0	0	25,577	0	0	18,930	0	18,930	0	0 0
System	4 Block	25,577	0	0	25,577	0	0	18,930	0	18,930	0	0 0

ZONE PSYCHROMETRICS - ALTERNATIVE 1  
 BLDG 5265 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C S T A T E P O I N T S -----

Zone 3

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	72.0	65.1	70.1	86.7	30.8	
Main System						
Return Air Heat Pickup						0.0
Return Fan						0.0
Return Air	72.0	65.1	70.1	86.7	30.8	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	74.2	66.5	67.8	90.5	31.9	
Blow through Fan						0.0
Entering Coil	74.2	66.5	67.8	90.5	31.9	
Leaving Coil	65.3	62.5	86.0	84.6	28.9	
Draw Through Fan						0.2
Duct Frictional Heat						0.3
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	65.8	62.7	84.6	84.6	29.0	
Supply Air	65.8	62.7	84.6	84.6	29.0	
Percent Outside Air		10.00	(%)			
Sensible Heat Ratio (SHR)		0.826				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		8,080	(Cfm)			

SYSTEM PSYCHROMETRICS - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- P S Y C H R O M E T R I C S T A T E P O I N T S -----

System 4

	Dry Bulb (F)	Wet Bulb (F)	Relat. Humid. (%)	Humid. Ratio (GR)	Enthalpy (Btu/Lb)	Temp. Diff. (F)
Space	72.0	59.9	50.0	61.5	26.9	
Main System						0.0
Return Air Heat Pickup						0.0
Return Fan						
Return Air	72.0	59.9	50.0	61.5	26.9	
Outdoor Air	94.0	77.6	48.8	124.0	42.1	
Return/Outdoor Air Mix	74.7	62.4	51.3	69.1	28.7	
Blow through Fan						0.0
Entering Coil	74.7	62.4	51.3	69.1	28.7	
Leaving Coil	53.0	51.5	91.3	57.3	21.6	
Draw Through Fan						0.6
Duct Frictional Heat						0.7
Supply Duct Heat Gain						0.0
Cold Deck Supply Air	54.2	52.1	87.1	57.3	21.9	
Supply Air	54.2	52.1	87.1	57.3	21.9	
Percent Outside Air		12.19	(%)			
Sensible Heat Ratio (SHR)		0.859				
Percent Supply Air Bypassing Coil		0.00	(%)			
Coil Airflow		19,450	(Cfm)			



BUILDING U-VALUES - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G U - V A L U E S -----

Room Number	Description	Part.	ExFlr	Room U-Values (Btu/hr/sqft/F)						Wall	Ceil.	Room Mass (lb/ sqft)	Room Capac. (Btu/ sqft/F)
				Summr	Wintr	Roof	Windo	Windo	Windo				
1	GEN MAINT BAYS	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.310	0.000		107.0	21.77
Zone	1 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.310	0.000		107.0	21.77
4	GEN MAINT BAYS	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.355	0.000		105.2	21.38
Zone	4 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.355	0.000		105.2	21.38
System	1 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.324	0.000		106.4	21.65
2	GEN MAINT SHOP	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.141	0.000		102.6	21.39
Zone	2 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.141	0.000		102.6	21.39
5	GEN MAINT SHOP	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.192	0.000		103.6	21.49
Zone	5 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.188	0.000		103.1	21.45
System	2 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.102	0.000		71.8	14.27
3	GEN MAINT ADMIN	0.297	0.660	0.000	0.000	0.000	0.568	0.596	0.102	0.000		71.8	14.27
Zone	3 Total/Ave.	0.297	0.660	0.000	0.000	0.000	0.568	0.596	0.102	0.000		71.8	14.27
System	3 Total/Ave.	0.297	0.660	0.000	0.000	0.000	0.568	0.596	0.153	0.000		107.7	22.24
6	GEN MAINT ADMIN	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.153	0.000		107.7	22.24
Zone	6 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.153	0.000		107.7	22.24
System	4 Total/Ave.	0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.153	0.000		107.7	22.24
Building		0.297	0.660	0.000	0.000	0.069	0.568	0.596	0.260	0.000		103.5	21.43

BUILDING AREAS - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

BUILDING AREAS

Room Number	Description	Number of Duplicate		Floor Area/Dupl Room (sqft)	Total Floor Area (sqft)	Partition Area (sqft)	Exposed Floor Area (sqft)	Skylight Area (sqft)	Sk1 /Rf (%)	Net Roof Area (sqft)	Window Area (sqft)	Win /W1 (%)	Net Wall Area (sqft)
		Flr	Rm										
1	GEN MAINT BAYS	1	1	19,255	19,255	1,030	936	0	0	19,923	3,454	14	21,926
Zone	1 Total/Ave.				19,255	1,030	936	0	0	19,923	3,454	14	21,926
4	GEN MAINT BAYS	1	1	8,520	8,520	150	403	0	0	8,520	1,280	11	10,004
Zone	4 Total/Ave.				8,520	150	403	0	0	8,520	1,280	11	10,004
System	1 Total/Ave.				27,775	1,180	1,339	0	0	28,443	4,734	13	31,930
2	GEN MAINT SHOP	1	1	65,268	65,268	10,080	64	0	0	64,800	297	18	1,325
Zone	2 Total/Ave.				65,268	10,080	64	0	0	64,800	297	18	1,325
5	GEN MAINT SHOP	1	1	75,060	75,060	13,536	784	0	0	73,017	4,512	23	15,524
Zone	5 Total/Ave.				75,060	13,536	784	0	0	73,017	4,512	23	15,524
System	2 Total/Ave.				140,328	23,616	848	0	0	137,817	4,809	22	16,849
3	GEN MAINT ADMIN	1	1	4,216	4,216	150	84	0	0	0	120	14	721
Zone	3 Total/Ave.				4,216	150	84	0	0	0	120	14	721
System	3 Total/Ave.				4,216	150	84	0	0	0	120	14	721
6	GEN MAINT ADMIN	1	1	26,557	26,557	10,800	415	0	0	24,109	568	8	6,812
Zone	6 Total/Ave.				26,557	10,800	415	0	0	24,109	568	8	6,812
System	4 Total/Ave.				26,557	10,800	415	0	0	24,109	568	8	6,812
Building					198,876	35,746	2,686	0	0	190,369	10,231	15	56,312

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

ASHRAE 90 ANALYSIS

Overall Roof U-Value = 0.069 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.307 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.131 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.47 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 23.29 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
BLDG 3265 BASERUN FT LEONARD WOOD

----- S Y S T E M L O A D P R O F I L E -----

System Totals

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	3.4	13	406	-601,290	3	122	16,667.0	31	2,731	946.5	0	0
5 - 10	6.8	9	278	-1,202,580	5	231	33,334.1	11	941	1,893.0	0	0
10 - 15	10.2	8	254	-1,803,870	7	319	50,001.1	0	0	2,839.5	0	0
15 - 20	13.6	12	357	-2,405,160	8	366	66,668.1	0	0	3,786.0	0	0
20 - 25	17.0	9	260	-3,006,450	11	519	83,335.2	0	0	4,732.5	0	0
25 - 30	20.4	8	232	-3,607,740	12	576	100,002.2	0	0	5,679.0	0	0
30 - 35	23.8	5	139	-4,209,031	13	591	116,669.3	0	0	6,625.5	0	0
35 - 40	27.2	7	210	-4,810,321	10	460	133,336.3	0	0	7,572.0	0	0
40 - 45	30.6	6	180	-5,411,610	7	314	150,003.3	0	0	8,518.5	0	0
45 - 50	34.0	5	152	-6,012,901	7	328	166,670.4	0	0	9,465.0	0	0
50 - 55	37.4	4	129	-6,614,191	8	380	183,337.4	0	0	10,411.5	0	0
55 - 60	40.8	6	190	-7,215,481	8	383	200,004.5	0	0	11,358.0	0	0
60 - 65	44.2	2	65	-7,816,771	1	62	216,671.5	0	0	12,304.5	0	0
65 - 70	47.6	2	65	-8,418,062	0	0	233,338.5	0	0	13,251.0	0	0
70 - 75	51.0	2	65	-9,019,352	0	0	250,005.6	0	0	14,197.5	0	0
75 - 80	54.3	1	20	-9,620,642	0	0	266,672.6	0	0	15,144.0	0	0
80 - 85	57.7	1	20	-10,221,932	0	0	283,339.7	0	0	16,090.5	0	0
85 - 90	61.1	0	0	-10,823,222	0	0	300,006.7	0	0	17,037.0	0	0
90 - 95	64.5	0	0	-11,424,512	0	0	316,673.7	58	5,088	17,983.5	0	0
95 - 100	67.9	0	0	-12,025,802	0	0	333,340.7	0	0	18,930.0	100	8,760
Hours Off	0.0	0	5,738	0	0	4,109	0.0	0	0	0.0	0	0

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

Main System 1 UH UNIT HEATERS

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.0	0	0	-188,310	7	292	6,918.1	0	0	0.0	0	0
5 - 10	0.0	0	0	-376,620	11	474	13,836.1	0	0	0.0	0	0
10 - 15	0.0	0	0	-564,930	21	920	20,754.2	0	0	0.0	0	0
15 - 20	0.0	0	0	-753,240	20	871	27,672.2	0	0	0.0	0	0
20 - 25	0.0	0	0	-941,550	13	590	34,590.3	0	0	0.0	0	0
25 - 30	0.0	0	0	-1,129,860	13	573	41,508.3	0	0	0.0	0	0
30 - 35	0.0	0	0	-1,318,170	14	603	48,426.4	0	0	0.0	0	0
35 - 40	0.0	0	0	-1,506,480	2	104	55,344.4	0	0	0.0	0	0
40 - 45	0.0	0	0	-1,694,790	0	0	62,262.5	0	0	0.0	0	0
45 - 50	0.0	0	0	-1,883,100	0	0	69,180.5	0	0	0.0	0	0
50 - 55	0.0	0	0	-2,071,410	0	0	76,098.6	0	0	0.0	0	0
55 - 60	0.0	0	0	-2,259,720	0	0	83,016.6	0	0	0.0	0	0
60 - 65	0.0	0	0	-2,448,030	0	0	89,934.7	0	0	0.0	0	0
65 - 70	0.0	0	0	-2,636,341	0	0	96,852.7	0	0	0.0	0	0
70 - 75	0.0	0	0	-2,824,650	0	0	103,770.8	0	0	0.0	0	0
75 - 80	0.0	0	0	-3,012,961	0	0	110,688.8	0	0	0.0	0	0
80 - 85	0.0	0	0	-3,201,271	0	0	117,606.9	0	0	0.0	0	0
85 - 90	0.0	0	0	-3,389,580	0	0	124,524.9	0	0	0.0	0	0
90 - 95	0.0	0	0	-3,577,891	0	0	131,443.0	0	0	0.0	0	0
95 - 100	0.0	0	0	-3,766,200	0	0	138,361.0	100	5,088	0.0	0	0
Hours Off	0.0	0	8,760	0	0	4,333	0.0	0	3,672	0.0	0	8,760

Main System 2 UV UNIT VENTILATOR

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.0	0	0	-389,980	2	92	8,372.5	0	0	0.0	0	0
5 - 10	0.0	0	0	-779,960	2	101	16,745.0	0	0	0.0	0	0
10 - 15	0.0	0	0	-1,169,940	5	212	25,117.5	0	0	0.0	0	0
15 - 20	0.0	0	0	-1,559,920	5	250	33,490.0	0	0	0.0	0	0
20 - 25	0.0	0	0	-1,949,900	8	362	41,862.5	0	0	0.0	0	0
25 - 30	0.0	0	0	-2,339,880	7	344	50,235.0	0	0	0.0	0	0
30 - 35	0.0	0	0	-2,729,860	10	485	58,607.5	0	0	0.0	0	0
35 - 40	0.0	0	0	-3,119,840	10	455	66,980.0	0	0	0.0	0	0
40 - 45	0.0	0	0	-3,509,820	10	464	75,352.5	0	0	0.0	0	0
45 - 50	0.0	0	0	-3,899,800	8	379	83,725.0	0	0	0.0	0	0
50 - 55	0.0	0	0	-4,289,781	7	312	92,097.5	0	0	0.0	0	0
55 - 60	0.0	0	0	-4,679,761	6	295	100,470.0	0	0	0.0	0	0
60 - 65	0.0	0	0	-5,069,741	7	309	108,842.5	0	0	0.0	0	0
65 - 70	0.0	0	0	-5,459,721	6	298	117,215.0	0	0	0.0	0	0
70 - 75	0.0	0	0	-5,849,701	6	293	125,587.5	0	0	0.0	0	0
75 - 80	0.0	0	0	-6,239,681	0	0	133,960.0	0	0	0.0	0	0
80 - 85	0.0	0	0	-6,629,661	0	0	142,332.5	0	0	0.0	0	0
85 - 90	0.0	0	0	-7,019,641	0	0	150,705.0	0	0	0.0	0	0
90 - 95	0.0	0	0	-7,409,622	0	0	159,077.5	0	0	0.0	0	0
95 - 100	0.0	0	0	-7,799,601	0	0	167,450.0	100	5,088	0.0	0	0
Hours Off	0.0	0	8,760	0	0	4,109	0.0	0	3,672	0.0	0	8,760

SYSTEM LOAD PROFILE - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

Main System 3 SZ SINGLE ZONE

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	0.9	24	633	-4,835	6	148	404.0	0	0	0.0	0	0
5 - 10	1.7	16	415	-9,670	6	141	808.0	0	0	0.0	0	0
10 - 15	2.6	13	339	-14,505	5	128	1,212.0	0	0	0.0	0	0
15 - 20	3.5	11	294	-19,340	11	287	1,616.0	0	0	0.0	0	0
20 - 25	4.3	14	361	-24,175	11	269	2,020.0	0	0	0.0	0	0
25 - 30	5.2	8	220	-29,010	15	374	2,424.0	0	0	0.0	0	0
30 - 35	6.0	8	211	-33,845	10	266	2,828.0	0	0	0.0	0	0
35 - 40	6.9	4	105	-38,680	15	382	3,232.0	0	0	0.0	0	0
40 - 45	7.8	2	65	-43,515	19	490	3,636.0	0	0	0.0	0	0
45 - 50	8.6	1	20	-48,350	2	62	4,040.0	0	0	0.0	0	0
50 - 55	9.5	0	0	-53,185	0	0	4,444.0	0	0	0.0	0	0
55 - 60	10.4	0	0	-58,020	0	0	4,848.0	0	0	0.0	0	0
60 - 65	11.2	0	0	-62,855	0	0	5,252.0	0	0	0.0	0	0
65 - 70	12.1	0	0	-67,690	0	0	5,656.0	0	0	0.0	0	0
70 - 75	13.0	0	0	-72,525	0	0	6,060.0	0	0	0.0	0	0
75 - 80	13.8	0	0	-77,360	0	0	6,464.0	0	0	0.0	0	0
80 - 85	14.7	0	0	-82,195	0	0	6,868.0	0	0	0.0	0	0
85 - 90	15.5	0	0	-87,030	0	0	7,272.0	0	0	0.0	0	0
90 - 95	16.4	0	0	-91,865	0	0	7,676.0	0	0	0.0	0	0
95 - 100	17.3	0	0	-96,700	0	0	8,080.0	100	8,760	0.0	0	0
Hours Off	0.0	0	6,097	0	0	6,213	0.0	0	0	0.0	0	8,760

Main System 4 TABVAV TERMINAL AIR BLENDER VAV

Percent Design Load	---- Cooling Load ----			----- Heating Load -----			---- Cooling Airflow ----			---- Heating Airflow ----		
	Cap. (Ton)	Hours (%)	Hours	Capacity (Btuh)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours	Cap. (Cfm)	Hours (%)	Hours
0 - 5	2.5	8	246	-18,165	6	100	972.5	9	256	946.5	0	0
5 - 10	5.1	10	291	-36,330	7	116	1,945.0	15	439	1,893.0	0	0
10 - 15	7.6	9	272	-54,495	6	104	2,917.5	10	284	2,839.5	0	0
15 - 20	10.1	7	220	-72,660	15	249	3,889.9	7	208	3,786.0	0	0
20 - 25	12.7	9	271	-90,825	13	226	4,862.4	12	369	4,732.5	0	0
25 - 30	15.2	0	226	-108,990	10	175	5,834.9	4	132	5,679.0	0	0
30 - 35	17.7	6	181	-127,155	16	273	6,807.4	4	127	6,625.5	0	0
35 - 40	20.3	5	160	-145,320	22	372	7,779.9	6	165	7,572.0	0	0
40 - 45	22.8	6	186	-163,485	4	73	8,752.4	2	62	8,518.5	0	0
45 - 50	25.3	5	149	-181,650	0	0	9,724.9	1	40	9,465.0	0	0
50 - 55	27.9	6	185	-199,815	0	0	10,697.3	2	67	10,411.5	0	0
55 - 60	30.4	4	112	-217,980	0	0	11,669.8	5	149	11,358.0	0	0
60 - 65	32.9	3	102	-236,145	0	0	12,642.3	5	151	12,304.5	0	0
65 - 70	35.5	5	147	-254,310	0	0	13,614.8	6	171	13,251.0	0	0
70 - 75	38.0	2	65	-272,475	0	0	14,587.3	4	108	14,197.5	0	0
75 - 80	40.5	2	65	-290,640	0	0	15,559.8	4	127	15,144.0	0	0
80 - 85	43.1	2	65	-308,805	0	0	16,532.3	1	43	16,090.5	0	0
85 - 90	45.6	1	20	-326,970	0	0	17,504.7	2	65	17,037.0	0	0
90 - 95	48.1	1	20	-345,135	0	0	18,477.2	1	20	17,983.5	0	0
95 - 100	50.7	0	0	-363,300	0	0	19,449.7	0	0	18,930.0	100	8,760
Hours Off	0.0	0	5,777	0	0	7,072	0.0	0	5,777	0.0	0	0

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

Temperature	Room Number					
Range	1	4	2	5	3	6
(F)						

Max. Temp.	104.9	99.9	87.0	93.0	83.9	84.6
Mo./Hr.	7 19	8 18	7 20	8 18	4 18	4 16
Day Type	1	1	2	1	1	2

	Number of Hours					
Above 100	0	0	0	0	0	0
95 - 100	171	0	0	0	0	0
90 - 95	514	419	0	371	0	0
85 - 90	811	755	605	1,402	0	0
80 - 85	942	892	1,848	1,144	222	501
75 - 80	694	1,243	1,007	737	844	1,567
70 - 75	867	990	612	457	7,694	6,692
65 - 70	4,743	4,332	4,688	4,649	0	0
60 - 65	18	129	0	0	0	0
55 - 60	0	0	0	0	0	0
50 - 55	0	0	0	0	0	0
Below 50	0	0	0	0	0	0

Min. Temp.	63.6	63.3	66.5	64.8	70.3	71.3
Mo./Hr.	5 6	5 6	5 7	5 6	5 8	9 7
Day Type	1	1	1	1	3	3

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

----- E Q U I P M E N T E N E R G Y C O N S U M P T I O N -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	42852	38751	45712	41008	44282	43869	41422	45712	41008	44282	41008	41422	511,329
	PK	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3
1	MISC LD													
	ELEC	26785	24231	29168	25537	27976	27919	25593	29168	25537	27976	25537	25593	321,019
	PK	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ10018													
		2-STG CTV <555 TONS												
	ELEC	0	0	0	0	6427	10150	13350	10223	6236	0	0	0	46,385
	PK	0.0	0.0	0.0	0.0	30.5	40.6	45.8	38.6	31.5	0.0	0.0	0.0	45.8
1	EQ5100													
		COOLING TOWER												
	ELEC	0	0	0	0	2994	3258	3924	3710	2532	0	0	0	16,418
	PK	0.0	0.0	0.0	0.0	5.5	5.5	5.5	5.5	5.5	0.0	0.0	0.0	5.5
1	EQ5100													
		COOLING TOWER												
	WATER	0	0	0	0	31	51	66	51	31	0	0	0	230
	PK	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
1	EQ5001													
		CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	1928	2098	2527	2389	1630	0	0	0	10,572
	PK	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	3.5
1	EQ5010													
		CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	2029	2208	2659	2514	1716	0	0	0	11,127

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 5265 BASERUN FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	3.7
1 EQ5300	CONTROL PANEL & INTERLOCK												
ELEC	0	0	0	0	544	592	713	674	460	0	0	0	2,983
PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
1 EQ4371	FAN COIL SUPPLY FAN												
ELEC	4440	4011	4440	4297	0	0	0	0	0	4440	4297	4440	30,365
PK	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0
2 EQ4372	UNIT VENTILATOR FAN												
ELEC	54392	49129	54392	52638	0	0	0	0	0	54392	52638	54392	371,974
PK	73.1	73.1	73.1	73.1	73.1	0.0	0.0	0.0	0.0	73.1	73.1	73.1	73.1
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	2637	2382	2637	2552	2637	2552	2637	2637	2552	2637	2552	2637	31,045
PK	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	2920	3506	4147	3809	2579	0	0	0	16,961
PK	0.0	0.0	0.0	0.0	17.0	15.6	17.0	16.0	14.7	0.0	0.0	0.0	17.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	7014	6335	7014	6787	7014	6787	7014	7014	6787	7014	6787	7014	82,580
PK	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1 EQ2002	GAS FIRE TUBE STEAM												
GAS	46344	42767	36471	11314	0	0	0	0	0	16093	25724	48592	227,304
PK	93.2	88.8	79.5	39.8	0.0	0.0	0.0	0.0	0.0	51.3	61.1	89.4	93.2
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	6383	5765	6383	3946	0	0	0	0	0	4598	6177	6383	39,635
PK	8.6	8.6	8.6	8.6	0.0	0.0	0.0	0.0	0.0	8.6	8.6	8.6	8.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	8947	8081	8947	5532	0	0	0	0	0	6446	8659	8947	55,559
PK	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0
1 EQ5307	BOILER CONTROLS												
ELEC	372	336	372	230	0	0	0	0	0	268	360	372	2,310
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1 EQ5061	CONDENSATE RETURN PUMP												
ELEC	421	380	421	260	0	0	0	0	0	303	407	421	2,611
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5406	MAKE-UP WATER												
WATER	46	42	46	29	0	0	0	0	0	33	45	46	288
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 5265 NIGHT SETBACK FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND	
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	152,227	456	35,543	41	132
Feb	137,580	456	33,308	37	136
March	156,126	456	27,559	37	130
April	137,586	456	8,323	14	85
May	142,233	476	0	25	0
June	131,299	477	0	46	0
July	121,651	428	0	56	0
Aug	133,382	473	0	46	0
Sept	130,900	474	0	29	0
Oct	146,310	456	11,171	16	98
Nov	144,520	456	17,525	34	113
Dec	149,605	456	37,999	41	137
Total	1,683,420	477	171,429	420	137

Building Energy Consumption = 115,089 (Btu/Sq Ft/Year)  
Source Energy Consumption = 177,414 (Btu/Sq Ft/Year)

Floor Area = 198,876 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 5265 NIGHT SETBACK FT LEONARD WOOD

EQUIPMENT ENERGY CONSUMPTION

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	42852	38751	45712	41008	44282	43869	41422	45712	41008	44282	41008	41422	511,329
	PK	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3
1	MISC LD													
	ELEC	26785	24231	29168	25537	27976	27919	25593	29168	25537	27976	25537	25593	321,019
	PK	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ10018													
		2-STG CTV <555 TONS												
	ELEC	0	0	0	0	5047	8560	10591	8544	5487	0	0	0	38,228
	PK	0.0	0.0	0.0	0.0	30.5	40.6	45.8	39.6	31.5	0.0	0.0	0.0	45.8
1	EQ5100													
		COOLING TOWER												
	ELEC	0	0	0	0	2020	2102	2218	2174	1926	0	0	0	10,441
	PK	0.0	0.0	0.0	0.0	5.5	5.5	5.5	5.5	5.5	0.0	0.0	0.0	5.5
1	EQ5100													
		COOLING TOWER												
	WATER	0	0	0	0	25	46	56	46	29	0	0	0	202
	PK	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
1	EQ5001													
		CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	1301	1354	1428	1400	1240	0	0	0	6,723
	PK	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	3.5
1	EQ5010													
		CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	1369	1425	1503	1473	1306	0	0	0	7,076

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 5265 NIGHT SETBACK FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	3.7
1 EQ5300	CONTROL PANEL & INTERLOCK												
ELEC	0	0	0	0	367	382	403	395	350	0	0	0	1,897
PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
1 EQ4371	FAN COIL SUPPLY FAN												
ELEC	4440	4011	4440	4297	0	0	0	0	0	4440	4297	4440	30,365
PK	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0
2 EQ4372	UNIT VENTILATOR FAN												
ELEC	54392	49129	54392	52638	47450	32966	24930	31210	42187	54392	52638	54392	550,717
PK	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	2637	2382	2637	2552	2637	2552	2637	2637	2552	2637	2552	2637	31,045
PK	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	2771	3383	3912	3655	2519	0	0	0	16,241
PK	0.0	0.0	0.0	0.0	17.0	15.6	17.0	17.0	14.7	0.0	0.0	0.0	17.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	7014	6335	7014	6787	7014	6787	7014	7014	6787	7014	6787	7014	82,580
PK	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1 EQ2002	GAS FIRE TUBE STEAM												
GAS	35543	33308	27559	8323	0	0	0	0	0	11171	17525	37999	171,429
PK	132.2	135.7	130.3	84.5	0.0	0.0	0.0	0.0	0.0	97.6	113.1	137.2	137.2
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	5585	5044	5053	1887	0	0	0	0	0	2205	4633	5585	29,992
PK	8.6	8.6	8.6	8.6	0.0	0.0	0.0	0.0	0.0	8.6	8.6	8.6	8.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	7829	7071	7083	2646	0	0	0	0	0	3091	6494	7829	42,042
PK	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0
1 EQ5307	BOILER CONTROLS												
ELEC	326	294	294	110	0	0	0	0	0	128	270	326	1,748
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1 EQ5061	CONDENSATE RETURN PUMP												
ELEC	368	332	333	124	0	0	0	0	0	145	305	368	1,976
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5406	MAKE-UP WATER												
WATER	41	37	37	14	0	0	0	0	0	16	34	41	218
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 5265 DDC CONTROL FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	WATER	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)		On Peak (Thrm/hr)
Jan	152,227	456	33,163	41	123
Feb	137,580	456	31,138	37	128
March	156,126	456	25,055	37	120
April	136,936	456	6,738	12	75
May	145,273	480	0	15	0
June	140,458	477	0	32	0
July	132,911	479	0	43	0
Aug	142,390	477	0	33	0
Sept	135,484	476	0	18	0
Oct	145,639	456	9,541	14	88
Nov	144,520	456	15,253	34	99
Dec	149,605	456	35,594	41	129
Total	1,719,149	480	156,481	356	129

Building Energy Consumption =	108,186 (Btu/Sq Ft/Year)	Floor Area =	198,876 (Sq Ft)
Source Energy Consumption =	171,342 (Btu/Sq Ft/Year)		

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 5265 DDC CONTROL FT LEONARD WOOD

----- E Q U I P M E N T E N E R G Y C O N S U M P T I O N -----

Ref	Equip Num Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	42852	38751	45712	41008	44282	43869	41422	45712	41008	44282	41008	41422	511,329
	PK	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3
1	MISC LD													
	ELEC	26785	24231	29168	25537	27976	27919	25593	29168	25537	27976	25537	25593	321,019
	PK	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTH2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ10018													
		2-STG CTV <555 TONS												
	ELEC	0	0	0	0	3177	6377	8197	6394	3593	0	0	0	27,737
	PK	0.0	0.0	0.0	0.0	26.0	35.2	40.0	33.3	26.9	0.0	0.0	0.0	40.0
1	EQ5100													
		COOLING TOWER												
	ELEC	0	0	0	0	1409	1904	2097	2042	1376	0	0	0	8,828
	PK	0.0	0.0	0.0	0.0	5.5	5.5	5.5	5.5	5.5	0.0	0.0	0.0	5.5
1	EQ5100													
		COOLING TOWER												
	WATER	0	0	0	0	15	32	43	33	18	0	0	0	142
	PK	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.2
1	EQ5001													
		CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	907	1226	1350	1315	886	0	0	0	5,685
	PK	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	3.5
1	EQ5010													
		CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	955	1291	1421	1384	932	0	0	0	5,983

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
BLDG 5265 DDC CONTROL FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	3.7
1 EQ5300	CONTROL PANEL & INTERLOCK												
ELEC	0	0	0	0	256	346	381	371	250	0	0	0	1,604
PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
1 EQ4371	FAN COIL SUPPLY FAN												
ELEC	4440	4011	4440	4297	0	0	0	0	0	4440	4297	4440	30,365
PK	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0
2 EQ4372	UNIT VENTILATOR FAN												
ELEC	54392	49129	54392	52638	54392	45332	39371	43247	50595	54392	52638	54392	604,912
PK	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	2637	2382	2637	2552	2637	2552	2637	2637	2552	2637	2552	2637	31,045
PK	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	2268	2854	3428	3107	1967	0	0	0	13,625
PK	0.0	0.0	0.0	0.0	14.6	15.7	17.0	15.9	14.5	0.0	0.0	0.0	17.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	7014	6335	7014	6787	7014	6787	7014	7014	6787	7014	6787	7014	82,580
PK	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1 EQ2002	GAS FIRE TUBE STEAM												
GAS	33163	31138	25055	6738	0	0	0	0	0	9541	15253	35594	156,481
PK	123.3	127.7	120.2	75.3	0.0	0.0	0.0	0.0	0.0	88.4	99.1	129.4	129.4
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	5585	5044	5053	1630	0	0	0	0	0	1939	4633	5585	29,469
PK	8.6	8.6	8.6	8.6	0.0	0.0	0.0	0.0	0.0	8.6	8.6	8.6	8.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	7829	7071	7083	2285	0	0	0	0	0	2718	6494	7829	41,309
PK	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0
1 EQ5307	BOILER CONTROLS												
ELEC	326	294	294	95	0	0	0	0	0	113	270	326	1,718
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1 EQ5061	CONDENSATE RETURN PUMP												
ELEC	368	332	333	107	0	0	0	0	0	128	305	368	1,942
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5406	MAKE-UP WATER												
WATER	41	37	37	12	0	0	0	0	0	14	34	41	214
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4

BLDG 5265 ECONOMIZER FT LEONARD WOOD

----- M O N T H L Y E N E R G Y C O N S U M P T I O N -----

Month	ELEC	DEMAND	GAS	WATER	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	(1000 G1)	On Peak (Thrm/hr)
Jan	152,227	456	33,163	41	123
Feb	137,580	456	31,138	37	128
March	156,126	456	25,055	37	120
April	136,936	456	6,738	12	75
May	145,134	480	0	14	0
June	140,308	477	0	31	0
July	132,830	479	0	42	0
Aug	142,204	477	0	32	0
Sept	135,301	476	0	17	0
Oct	145,639	456	9,541	14	88
Nov	144,520	456	15,253	34	99
Dec	149,605	456	35,594	41	129
Total	1,718,411	480	156,481	350	129

Building Energy Consumption = 108,173 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 171,304 (Btu/Sq Ft/Year)

Floor Area = 198,876 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 5265 ECONOMIZER FT LEONARD WOOD

----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	42852	38751	45712	41008	44282	43869	41422	45712	41008	44282	41008	41422	511,329
	PK	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3
1	MISC LD													
	ELEC	26785	24231	29168	25537	27976	27919	25593	29168	25537	27976	25537	25593	321,019
	PK	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ10018													
		2-STG CTV <555 TONS												
	ELEC	0	0	0	0	3038	6227	8116	6208	3410	0	0	0	26,999
	PK	0.0	0.0	0.0	0.0	26.0	35.2	40.0	33.3	26.9	0.0	0.0	0.0	40.0
1	EQ5100													
		COOLING TOWER												
	ELEC	0	0	0	0	1409	1904	2097	2042	1376	0	0	0	8,828
	PK	0.0	0.0	0.0	0.0	5.5	5.5	5.5	5.5	5.5	0.0	0.0	0.0	5.5
1	EQ5100													
		COOLING TOWER												
	WATER	0	0	0	0	14	31	42	32	17	0	0	0	136
	PK	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.2
1	EQ5001													
		CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	907	1226	1350	1315	886	0	0	0	5,685
	PK	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	3.5
1	EQ5010													
		CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	955	1291	1421	1384	932	0	0	0	5,983



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
BLDG 5265 ECONOMIZER FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	3.7
1 EQ5300	CONTROL PANEL & INTERLOCK												
ELEC	0	0	0	0	256	346	381	371	250	0	0	0	1,604
PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
1 EQ4371	FAN COIL SUPPLY FAN												
ELEC	4440	4011	4440	4297	0	0	0	0	0	4440	4297	4440	30,365
PK	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0
2 EQ4372	UNIT VENTILATOR FAN												
ELEC	54392	49129	54392	52638	54392	45332	39371	43247	50595	54392	52638	54392	604,912
PK	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	2637	2382	2637	2552	2637	2552	2637	2637	2552	2637	2552	2637	31,045
PK	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	2268	2854	3428	3107	1967	0	0	0	13,625
PK	0.0	0.0	0.0	0.0	14.6	15.7	17.0	15.9	14.5	0.0	0.0	0.0	17.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	7014	6335	7014	6787	7014	6787	7014	7014	6787	7014	6787	7014	82,580
PK	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1 EQ2002	GAS FIRE TUBE STEAM												
GAS	33163	31138	25055	6738	0	0	0	0	0	9541	15253	35594	156,481
PK	123.3	127.7	120.2	75.3	0.0	0.0	0.0	0.0	0.0	88.4	99.1	129.4	129.4
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	5585	5044	5053	1630	0	0	0	0	0	1939	4633	5585	29,469
PK	8.6	8.6	8.6	8.6	0.0	0.0	0.0	0.0	0.0	8.6	8.6	8.6	8.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	7829	7071	7083	2285	0	0	0	0	0	2718	6494	7829	41,309
PK	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0
1 EQ5307	BOILER CONTROLS												
ELEC	326	294	294	95	0	0	0	0	0	113	270	326	1,718
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1 EQ5061	CONDENSATE RETURN PUMP												
ELEC	368	332	333	107	0	0	0	0	0	128	305	368	1,942
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5406	MAKE-UP WATER												
WATER	41	37	37	12	0	0	0	0	0	14	34	41	214
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 5265 OA NIGHTIME FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	WATER	GAS DMND
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)		On Peak (Thrm/hr)
Jan	154,242	456	11,704	46	33
Feb	139,400	456	10,331	42	31
March	158,987	456	8,220	45	27
April	140,187	456	1,902	21	11
May	98,318	411	0	28	0
June	102,245	422	0	46	0
July	102,925	428	0	56	0
Aug	107,260	420	0	47	0
Sept	90,772	412	0	30	0
Oct	148,326	456	2,066	22	13
Nov	145,604	456	5,006	37	18
Dec	151,621	456	12,618	46	32
Total	1,539,887	456	51,847	467	33

Building Energy Consumption = 52,497 (Btu/Sq Ft/Year)  
Source Energy Consumption = 106,730 (Btu/Sq Ft/Year)

Floor Area = 198,876 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 5265 OA NIGHTTIME FT LEONARD WOOD

----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N -----

Ref	Equip Num Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	42852	38751	45712	41008	44282	43869	41422	45712	41008	44282	41008	41422	511,329
	PK	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3
1	MISC LD													
	ELEC	26785	24231	29168	25537	27976	27919	25593	29168	25537	27976	25537	25593	321,019
	PK	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW20	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S													
		2-STG CTV <555 TONS												
	ELEC	0	0	0	0	5994	9456	11857	9634	5972	0	0	0	42,914
	PK	0.0	0.0	0.0	0.0	30.5	40.6	45.8	38.6	31.5	0.0	0.0	0.0	45.8
1	EQ5100													
		COOLING TOWER												
	ELEC	0	0	0	0	2994	3258	4095	3710	2532	0	0	0	16,588
	PK	0.0	0.0	0.0	0.0	5.5	5.5	5.5	5.5	5.5	0.0	0.0	0.0	5.5
1	EQ5100													
		COOLING TOWER												
	WATER	0	0	0	0	28	46	56	47	30	0	0	0	208
	PK	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
1	EQ5001													
		CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	1928	2098	2637	2389	1630	0	0	0	10,682
	PK	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	3.5
1	EQ5010													
		CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	2029	2208	2775	2514	1716	0	0	0	11,242

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
BLDG 5265 OA NIGHTIME FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	3.7
1 EQ5300	CONTROL PANEL & INTERLOCK												
ELEC	0	0	0	0	544	592	744	674	460	0	0	0	3,014
PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
1 EQ4371	FAN COIL SUPPLY FAN												
ELEC	4440	4011	4440	4297	0	0	0	0	0	4440	4297	4440	30,365
PK	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0
2 EQ4372	UNIT VENTILATOR FAN												
ELEC	54392	49129	54392	52638	0	0	0	0	0	54392	52638	54392	371,974
PK	73.1	73.1	73.1	73.1	0.0	0.0	0.0	0.0	0.0	73.1	73.1	73.1	73.1
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	2637	2382	2637	2552	2637	2552	2637	2637	2552	2637	2552	2637	31,045
PK	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	2920	3506	4152	3809	2579	0	0	0	16,966
PK	0.0	0.0	0.0	0.0	17.0	15.6	17.0	16.0	14.7	0.0	0.0	0.0	17.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	7014	6335	7014	6787	7014	6787	7014	7014	6787	7014	6787	7014	82,580
PK	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1 EQ2002	GAS FIRE TUBE STEAM												
GAS	11704	10331	8220	1902	0	0	0	0	0	2066	5006	12618	51,847
PK	32.9	31.3	27.5	11.2	0.0	0.0	0.0	0.0	0.0	13.2	17.7	31.5	32.9
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	6383	5765	6185	2917	0	0	0	0	0	3003	5062	6383	35,697
PK	8.6	8.6	8.6	8.6	0.0	0.0	0.0	0.0	0.0	8.6	8.6	8.6	8.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	8947	8081	8671	4089	0	0	0	0	0	4209	7095	8947	50,039
PK	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0
1 EQ5307	BOILER CONTROLS												
ELEC	372	336	360	170	0	0	0	0	0	175	295	372	2,081
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1 EQ5061	CONDENSATE RETURN PUMP												
ELEC	421	380	408	192	0	0	0	0	0	198	333	421	2,352
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5406	MAKE-UP WATER												
WATER	46	42	45	21	0	0	0	0	0	22	37	46	259
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 5265 OA DAYTIME FT LEONARD WOOD

----- MONTHLY ENERGY CONSUMPTION -----

Month	ELEC	DEMAND	GAS	GAS DMND	
	On Peak (kWh)	On Peak (kW)	On Peak (Therm)	WATER (1000 G1)	On Peak (Thrm/hr)
Jan	154,242	456	11,819	46	33
Feb	139,400	456	10,425	42	32
March	158,987	456	8,289	45	28
April	140,187	456	1,903	21	11
May	97,895	407	0	28	0
June	101,630	412	0	43	0
July	101,984	415	0	54	0
Aug	106,679	411	0	44	0
Sept	90,485	407	0	28	0
Oct	148,326	456	2,077	22	13
Nov	145,604	456	5,055	37	18
Dec	151,621	456	12,726	46	32
Total	1,537,039	456	52,294	456	33

Building Energy Consumption = 52,672 (Btu/Sq Ft/Year)  
Source Energy Consumption = 106,820 (Btu/Sq Ft/Year)

Floor Area = 198,876 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 5265 OA DAYTIME FT LEONARD WOOD

----- EQUIPMENT ENERGY CONSUMPTION -----

Ref Num	Equip Code	Monthly Consumption												Total
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
0	LIGHTS													
	ELEC	42852	38751	45712	41008	44282	43869	41422	45712	41008	44282	41008	41422	511,329
	PK	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3	172.3
1	MISC LD													
	ELEC	26785	24231	29168	25537	27976	27919	25593	29168	25537	27976	25537	25593	321,019
	PK	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9	169.9
2	MISC LD													
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	MISC LD													
	OIL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	MISC LD													
	P STEAM	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	MISC LD													
	P HOTW2O	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	MISC LD													
	P CHILL	0	0	0	0	0	0	0	0	0	0	0	0	0
	PK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	EQ1001S													
		2-STG CTV <555 TONS												
	ELEC	0	0	0	0	6007	8852	11360	9065	5693	0	0	0	40,977
	PK	0.0	0.0	0.0	0.0	25.6	29.9	32.8	29.3	25.9	0.0	0.0	0.0	32.8
1	EQ5100													
		COOLING TOWER												
	ELEC	0	0	0	0	2823	3258	3924	3710	2532	0	0	0	16,247
	PK	0.0	0.0	0.0	0.0	5.5	5.5	5.5	5.5	5.5	0.0	0.0	0.0	5.5
1	EQ5100													
		COOLING TOWER												
	WATER	0	0	0	0	28	43	54	44	28	0	0	0	197
	PK	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.2
1	EQ5001													
		CHILLED WATER PUMP C.V.												
	ELEC	0	0	0	0	1818	2098	2527	2389	1630	0	0	0	10,462
	PK	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0	3.5
1	EQ5010													
		CONDENSER WATER PUMP C.V.												
	ELEC	0	0	0	0	1913	2208	2659	2514	1716	0	0	0	11,011

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
BLDG 5265 OA DAYTIME FT LEONARD WOOD

PK	0.0	0.0	0.0	0.0	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	3.7
1 EQ5300	CONTROL PANEL & INTERLOCK												
ELEC	0	0	0	0	513	592	713	674	460	0	0	0	2,952
PK	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0
1 EQ4371	FAN COIL SUPPLY FAN												
ELEC	4440	4011	4440	4297	0	0	0	0	0	4440	4297	4440	30,365
PK	6.0	6.0	6.0	6.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	6.0	6.0
2 EQ4372	UNIT VENTILATOR FAN												
ELEC	54392	49129	54392	52638	0	0	0	0	0	54392	52638	54392	371,974
PK	73.1	73.1	73.1	73.1	0.0	0.0	0.0	0.0	0.0	73.1	73.1	73.1	73.1
3 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	2637	2382	2637	2552	2637	2552	2637	2637	2552	2637	2552	2637	31,045
PK	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4 EQ4002	BI CENTRIF. FAN C.V.												
ELEC	0	0	0	0	2911	3495	4134	3798	2571	0	0	0	16,909
PK	0.0	0.0	0.0	0.0	17.0	15.6	17.0	16.0	14.6	0.0	0.0	0.0	17.0
4 EQ4003	FC CENTRIF. FAN C.V.												
ELEC	7014	6335	7014	6787	7014	6787	7014	7014	6787	7014	6787	7014	82,580
PK	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1 EQ2002	GAS FIRE TUBE STEAM												
GAS	11819	10425	8289	1903	0	0	0	0	0	2077	5055	12726	52,294
PK	33.4	31.8	27.9	11.2	0.0	0.0	0.0	0.0	0.0	13.5	17.7	32.1	33.4
1 EQ5020	HEAT WATER CIRC. PUMP C.V.												
ELEC	6383	5765	6185	2917	0	0	0	0	0	3003	5062	6383	35,697
PK	8.6	8.6	8.6	8.6	0.0	0.0	0.0	0.0	0.0	8.6	8.6	8.6	8.6
1 EQ5240	BOILER FORCED DRAFT FAN												
ELEC	8947	8081	8671	4089	0	0	0	0	0	4209	7095	8947	50,039
PK	12.0	12.0	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	12.0
1 EQ5307	BOILER CONTROLS												
ELEC	372	336	360	170	0	0	0	0	0	175	295	372	2,081
PK	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
1 EQ5061	CONDENSATE RETURN PUMP												
ELEC	421	380	408	192	0	0	0	0	0	198	333	421	2,352
PK	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6
1 EQ5406	MAKE-UP WATER												
WATER	46	42	45	21	0	0	0	0	0	22	37	46	259
PK	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

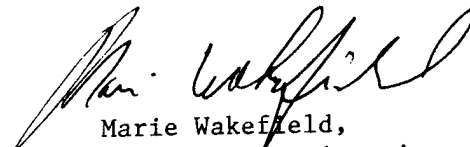


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